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SPECIAL ISSUE
AUTOMATION IN RETAILING

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JOURNAL OF RETAILING
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Why the Retailing Lag in Adopting Automation

In a world busily engaged in tapping energy from the smallest particles of matter while simultaneously probing the farthest reaches of outer space, retailers, too, feel the challenge of a more scientific future. Even the retailer who is not inspired by the intellectual excitement of adapting the latest in science and industry to the operation of his own business is moved by the practical need to reduce the high costs of running a store. Actually, when his competitors introduce new methods, he has no choice but to improve his own way of performing the distributive function. Thus competitive necessity, as well as free incentives, force him to examine new developments . . . and *to select carefully those which fit his way of doing business at costs which can be absorbed.*

Yet despite theoretical acceptance of these facts—and *some noble experiments—successful retail installations of the newest electronic, mechanical, and electromechanical devices are still the exception rather than the rule. Why? Has the essential diversity of retailing resisted the standardization of method and design which is characteristic of machine operation? Or have retailers failed to communicate their needs and spell out their problems to the men who make the machines? Whatever the reason, retailing has lagged, though it has certainly not stood still.*

In this Special Issue on Automation, the JOURNAL OF RETAILING *neither pleads the virtues nor decries the limitations of automation in stores. Rather it takes stock of what has been done (or deliberately* not *done) to date, with some probing as to why. It may also offer some inkling of what may lie ahead for those enterprising enough to explore new developments with due regard for caution and the careful examination of* all *the facts, or all the pieces of a challenging but bewildering jigsaw puzzle.*

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The Electronic Potential in Retailing

ROBERT I. JONES AND JOHN R. SPELLMAN

Partners, Arthur Andersen and Company

What are the particular problems in adapting electronic equipment to retailing? How can the financial costs be absorbed in the introductory years of using electronics? What can electronic equipment do in the areas of sales promotion and over-all economic planning, as well as in the already proved area of minimizing clerical costs? What lessons can be learned from other industries which have steadily increased their use of electronics to solve everyday problems?

These and related questions are considered in detail by Mr. Jones who is in charge of the Merchandising Industry Program at Arthur Andersen and Company and by Mr. Spellman who is in charge of the firm's Electronic Program. Regular readers of the JOURNAL OF RETAILING *will recall that last year Mr. Jones wrote a detailed account of Merchandise Management Accounting for our Special Spring Issue devoted to that subject. The last section of the present article considers the use of electronics in collecting customer preference data, unit data for inventory management, profitability reporting, expense control, and credit analysis.*

In the past five years, the field of electronic data processing has experienced a growth that has been equaled by few other industries. Only five years ago, it was no problem at all to enumerate every company with a computer on its premises or a computer on order. Today, the number of installations well exceeds a thousand, and the number of computers on order (though not known precisely) undoubtedly equals the number already installed. Numbers tell only part of the story, however. The advances in computer

design have come so rapidly that many computers become obsolete the day they are installed. The computers of only five years ago seem almost crude in comparison with today's compact transistorized equipment.

Wide Transistorized Use of Electronic Data Processing

Paralleling this growth in numbers and these advances in computer design has been a constant search and resulting discovery of new areas of application. Although there has never been a lack of theorizing about the wide applicability of computers, the early installations were fairly well confined to a few large manufacturing concerns, utilities, and insurance companies; and the applications were generally limited to such areas as payroll, billing, and related operations. Theorizing, of course, still keeps well ahead of doing, but a great many applications which were theory only yesterday are practice today. Many concerns which only yesterday felt they were much too small for a computer—and probably *were* for the computers then available—now find a machine that meets their requirements in every respect. And industries which a few years ago seemed to have functions which defied efficient mechanization of any type, including electronic equipment, find today that often a computer—perhaps a specially designed one—is exactly what they need to help solve these very problems.

Certainly the past five years have witnessed a remarkable rate of development in the electronic data processing field. But on the other hand, how far have we really progressed? A thousand or even two thousand computers is not a staggering number when we consider the hundreds of thousands of business organizations in the nation. The list of applications, though constantly growing, really only scratches the surface of our imaginations. And the roster of industries not using computers contains some impressive names.

Most notable among these, perhaps, is retailing. Why are there only one or two thousand computers installed, or being installed, in retailing firms instead of ten or twenty thousand? Perhaps the answer is simply, "It takes time." Perhaps retailing is one of those industries in which computers will never find widespread applicability. We do not believe the latter view to be true . . . but it *is* true that the place of computers in retailing is not yet well defined.

General Approach

What has been learned about using computers in other industries, and how can this knowledge be useful to retailers? At present there seem to be three basic approaches used by industry:

1. Install a computer to reduce costs.
2. Install a computer to be used as a management tool, but pay for it first through cost reductions.
3. Install a computer to be used strictly as a management tool.

Cost Approach

The first approach followed, for many reasons, was to install electronic equipment in order to reduce costs. The areas most adaptable to this ap-

proach were those using large pools of clerical help and mechanical accounting equipment. Insurance premium billing, utility billing, and almost any payroll are typical of such areas. It is not surprising, therefore, that early installations consisted to a great extent of these applications.

In some cases there has been criticism of this approach, presumably because it is unimaginative or because it does not make full use of the powerful abilities of the computer. But the "other" uses of the equipment were for a long time only very nebulously defined, and it would have taken either an extremely far-sighted management, or an exceedingly imprudent one, to disregard possible direct cost savings and install a computer to be used in a rather ill-defined way as a rather ill-defined management tool, at a very well-defined cost of $25,000 a month and upward. Today, far more is known about using electronic equipment as a management tool, but this does not mean that every computer must be so used. There are many applications for computers where the primary benefit to be derived is a reduction in cost. Certainly, direct cost reductions offer a powerful and compelling reason for using this equipment. Further, management would be somewhat remiss in not continually seeking such advantages whenever they can be attained.

Financial Planning

Although many of the first organizations using electronic equipment took the cost reduction approach, they have not all limited their use to the original applications. As the initial data processing applications were completed, and with computer time still available, they have experimented with new areas of application whereby the top operating management could be provided with information to operate more effectively.

Typical of these new areas of application are sales forecasting, budgeting and financial planning, and complete production and material control systems. These so-called "new" applications are not well named as there is nothing particularly new about sales forecasting, budgeting and financial planning, or material and production control. However, there is a decided difference between the basic objectives of the original cost-saving applications and these later, or "new," applications. Ordinarily with the original applications, there was little change in the end product itself; only the means of attaining the end product was new. But often with the later applications, both the means of attaining the end product, and the end product itself, are new.

For instance, one company which developed a new plan for sales forecasting had always forecasted sales by one means or another; but the use of electronics permitted an entirely new approach to provide additional and more accurate information. With these data, forecasting has produced immediately apparent results. For all practical purposes, the only similarity between the new method of sales forecasting and the old method was in the name itself. This seems to be quite generally the result with the use of electronic equipment as a management tool.

Once these new applications have been put into use, their effectiveness has become emphatically apparent.

With the facility to do financial planning and budgeting on the basis of information which can be completely revised as often as needed in a matter of a few hours and with the availability of inventory records which report yesterday's inventory today and not three weeks from today, it is apparent that management has a tremendously effective tool for increasing operating efficiency. The value of such applications could easily exceed the cost reductions attributable to the original applications, though, of course, it has been difficult to assign a precise dollar value to them. The best measure of their effectiveness is the opinion of the men who have had the opportunity to utilize these new tools in their own organizations. These opinions are perhaps typified by the observation of one executive that if there was not enough computer time to do the payroll and the new applications, the payroll would have to go.

Many executives have indicated a desire to proceed with a computer installation for these new applications alone. Some have done so. But the cold, hard facts have shown that electronic equipment is costly and that the use of a computer as a management tool is in its infancy. Facing these facts, the best approach has seemed to be a compromise: install the computer for use as a management tool, but pay for it through cost reductions. This approach involves selecting one or more routine accounting or record-keeping applications which can be placed on the computer with a minimum of time—applications which will produce a cost savings that will offset at least a portion of the cost of the computer and which will consume a minimum amount of computer time. This, then, provides the equipment with which to develop management-type applications with a minimum investment. This is a rather comfortable approach to installing a computer—a way of eating your cake and having it too.

Consider the company which cannot quite justify a computer on the basis of cost reduction alone. The best it can do is approach a break-even in operating costs. The management feels very strongly that the computer could be a valuable management tool, but the company is not in a position to invest a million dollars in what appears to be a research project. Five years ago, this company probably would have deferred further consideration of the equipment. But with this second approach the company can proceed, since a part of the equipment cost can be recovered through the more or less routine data processing functions. Once these functions have been placed on the computer, it is then possible to proceed with the development and implementation of applications which utilize the equipment as a management tool.

Case Report

In 1955, a large manufacturing firm made its decision to proceed with installation of an electronic system. This company had recognized for years that its size—the thing which enabled it to provide every service its customers required—had often stood in the way of rendering that very service. Because operating management could no longer maintain direct touch with its thousands of customers, it often had to work with

inadequate and untimely information. There were the obvious consequences. Finished goods inventories were growing, but orders went unfilled. In the face of mounting raw material inventories, critical shortages often interfered with efficient production. To increase the efficiency of the company's internal operations, to reduce inventory losses and to provide more effective service to its customers an entirely new system of reporting was needed—one which could provide accurate, complete, and timely information for operating management so that they might make more informed decisions about the procurement of material, the planning of production, and the stocking of finished goods. In developing this system, the company soon realized that some sort of mechanical data processing equipment would be required. Conventional punched-card equipment provided a partial and temporary answer to the data processing requirements, but it soon became apparent that only an electronic system could do the complete job.

This was in 1955. Although the company had this very complete plan for using a computer as a management tool, it felt it could not proceed without first selecting an application which would immediately pay for the computer. The application selected was payroll, but further investigation revealed that the payroll operation was not a simple one. It would consume quite a large share of the computer's time, it would take no less than a year in development, and after all that, it might just barely cover the computer costs. And so the company changed its plans. It dropped the payroll plan and started immediately to work out the new co-ordinated system of reporting for material procurement, production, inventory, and sales. What the company had done was to shift from the second approach to the third—to use the computer strictly as a tool for management control. The results which have been attained today have even exceeded the original goals.

Specialists in the field agree that the most effective use of electronics is in over-all management control. But applying electronics to the basic problems of operating a business is not easy to do. By its very nature, this approach may require entirely new systems of reporting, new media for recording transactions, new methods of operation, and perhaps even changes in basic operating policies. For these reasons, this approach is unlikely to assume the number one position for a number of years.

While the foregoing has been concerned with the use of computers in general industry, the importance to the retailing industry of the three approaches is apparent. Understanding of these approaches provides at least a partial answer as to why computers have not yet made a significant impact on the retailing industry. To date, it has been extremely difficult to find computer applications in the industry which will yield substantial cost reductions and almost as difficult to find applications which will just break even. On the other hand, experience in different industries tends to show that the greatest advantage of using this equipment may lie even more in management planning than in reduction of clerical costs. If this is so, a complete

reappraisal of electronic equipment for retailing may be in order.

Management Tool for Retailing

In looking at the management tool approach for the retailing industry, it is necessary, of course, to proceed on the assumption that the electronic equipment available today is adequate to meet the requirements of the industry. This appears to be a valid assumption and probably has been valid for several years. The cost of performing a unit of work on today's computers is somewhat less than the cost of doing that same unit of work on a computer of two or three years ago, but the *ability* to do the work existed then just as it does now. Today, general purpose computers are available in a range of monthly rentals from $3,500 to $50,000. The purchase price for this same equipment is from $100,000 to about $2,500,000.

Of the special purpose equipment available, the point-of-sale recording equipment is probably of greatest significance to retailing. A complete unit of this equipment currently costs from $5,000 to $7,000. This cost has been considered as a restraining factor in the widespread use of the recording equipment just as the cost of the electronic computers seems to have presented a barrier. But this should be so only when cost reduction is the sole objective of the equipment's use. In the management control approach, $5,000 to $7,000 may be a very reasonable price to pay for equipment to record sales transactions if the information thus made available is of real value for planning as well as accounting functions.

Value in Merchandising

Although there are definite possibilities for aiding the operating and control divisions of the store with electronics, the greatest potential seems to lie in the merchandising field. Here, the most obvious and immediate benefit of electronic data processing is in capturing improved unit information. In fact, the future of electronic equipment in retailing may depend primarily upon its capacity to provide these unit data. With the exception of customer billing, there is probably no other single area of the store which would so justify electronic data processing.

Attempts to obtain good unit information have been going on for some time in retailing; methods range from purely clerical systems to the use of tabulating equipment either on a manual punch basis or coupled with print-punch tickets. Over and above the cost of such methods, which may or may not be reduced through electronics, the most frequently cited weaknesses in present methods have been: slowness, inaccuracy, incompleteness. If these disadvantages are reversed, the apparent strong points in capturing unit information through electronic data processing become evident:

1. *Timeliness.* The data can be obtained promptly.

2. *Accuracy.* There are two factors in respect to this. First, when the print-punch ticket is used with a floor media reader, there is the assurance that all sales are reported and, second,

since the punch-ticket information is recorded directly onto the tape, clerical errors in transcribing unit information are completely eliminated.

3. *Completeness.* The flexibility of electronic equipment permits summarizing and reporting of unit information on many different bases—by vendor, classification, color, style, size, or any other significant features. Also, new facets of profitability can be reported, other than sheer volume; for example, markup, markdowns, stock level, and controllable profit. Data on sales omissions or lost sales can also be reported currently.

Unit data which are timely, accurate, and complete are the key which will open the door to many improved merchandising techniques. In particular, it is possible to see significant strides in the areas of customer preference, inventory management, and profitability reporting.

Customer Preference. A customer preference program requires unit information which includes customer demand and stock levels. To know demand, one must recognize sales omissions or lost sales as well as the recorded or realized sales. Existing unit systems do not include omissions and thus do not report total demand—the true measure of customer preference. Also, the measurement of customer preference usually requires a very detailed reporting of unit data (by feature) and may require considerable probing; the unit data may have to be re-sorted and summarized on several different bases in order to find the key feature of the demand pattern. The flexibility available in electronic equipment should provide a practical answer to the problem of meeting these requirements of an effective customer preference program. Another requirement of a customer preference program is timeliness; preference data must be current to be of value. In this respect, electronics promises to improve upon present methods. While the benefits of a customer preference program remain to be proved on a large-scale basis, there is ample evidence that this would be a significant step in the direction of improving volume and turnover and minimizing markdowns.

Inventory Management. Prompt, good quality unit data should also lead to improved inventory management. In some instances automatic reordering may be introduced on a selective basis for staples. This type of replenishment might be geared to certain levels of current unit volume and might be refined to distinguish between different sizes or seasons. This would permit the merchant to devote more attention to the more important area of non-staples. In this area, current reporting might be handled on an "exception" basis with only the "hot" items, the slow sellers, overstocks and "outs" reported to the buyer. The application of optimum order quantity principles can then be introduced on a sound basis in selected departments as a guide to proper stock levels. Possibly the most significant improvement in this area would be the freeing of the merchant from routine duties so that he can concentrate on problem items. Not to be overlooked, however, are the direct benefits of improved volume, turnover, and customer service.

Profitability Reporting. Timely, accurate, and complete unit data should

pave the way for improvements in profitability reporting too. Unit information available through electronics could generally tell the merchant more about the item than is now available to him. In addition to accumulating the data on colors, styles, and features required in customer preference, it would be possible to accumulate and report currently on unit profitability. This profitability reporting might be limited to markups and markdowns, both of which could be fed into the system from a point-of-sale recorder and media reader. As an alternative, markups could be obtained through an analysis in the accounts payable processing. Certainly this kind of margin reporting would be made by vendor and could also be made for each classification or other significant bases as desired. Another possibility would be a reporting of profitability by salesperson with a tie-in to the individual compensation plans. For those stores desiring more refined profit information, item controllable profit as developed by a Merchandise Management Accounting program could be reported currently. Certainly, the potential for knowing more about profitability on a current basis is an appealing possibility with electronic equipment.

EXPENSE CONTROL. Although electronic data processing appears at this point to offer the greatest benefits to the merchandising division, the system could also generate new and improved management information for the operating and control divisions of the store. Leading areas where the computer will help are productivity measurement and expense control. Good progress has been made to date in these areas, but the present manual methods are limited in dealing with further refinements in expense accounting and production unit accumulation. The major contribution of electronic equipment in this area would probably be its capacity to process and summarize masses of production data for reporting purposes. For instance, present production measurement methods may highlight a decreasing productivity in the total delivery operation and a consequent rise in unit delivery costs. An electronic system might supplement this by providing productivity results for each of the many delivery routes. This would serve to isolate density problems on specific routes and provide real action information. Improvement in departmental reporting should be possible since present complicated expense allocations could be handled on a routine basis by the computer. Better quality in the departmental statements will make them more meaningful to the buyer and can serve to give the buyer some degree of responsibility for control of operating costs.

Certain areas of expense are not now subject to really effective control since the underlying reasons for the expense are lost in the mass of details. For example, the cost of customer returns has a heavy impact on many expenses in the store—delivery, adjusting and markdowns, just to mention a few. Most stores today know very little about customer returns other than the total and frequency of returns by departments. It is generally conceded that, in order to control returns effectively, management should know a good deal more about the problem. Management should know the reasons for the

returns as well as the return experience for specific items or types of merchandise rather than just the broad departmental experience. Today, attempts to obtain this type of information are pretty well limited to periodic special studies of returns. It is possible that electronic equipment could provide a continuing analysis and summary of return experience on a meaningful basis. The potential for electronics here lies in its ability for practical processing of mass data and its flexibility in reanalyzing mass data in a search for key patterns.

Credit Analysis. Another specific problem area where electronics may be of value is in the accounts receivable and credit departments. Considerable data is already available on the potential of electronics in these areas for cost saving. Using a computer application here might also offer worthwhile fringe benefits in the form of improved management information about the accounts. For example, the accounts could be continuously reviewed for delinquent or overbought customers, with current reporting on an "exception" basis to permit early action on problem accounts. Another possibility is the use of electronics to analyze mass credit data to search out any patterns or characteristics which might help the retailer in the early identification of problem accounts.

Summary

These, then, are some of the functions in retailing which seem particularly adaptable to electronic data processing. In discussing these areas, however, we have not presumed to create an all-inclusive check list of likely computer applications. Rather, these have been selected because they are typical of the management tool approach to computer utilization in the retailing industry. In the final analysis, the program followed by any one organization must be tailored to meet its own specific requirements which, to a great extent, will be dictated by the nature of the business and the policies of the store.

In summary, there appear to be three points of importance to the retailing industry:

First, electronic equipment can produce many benefits as a tool in the management and control of business. This has been demonstrated through its use in industry in general. Although this particular field of computer utilization is still relatively new, the trend leaves little doubt that it will be an extremely important one in the future.

Second, an examination of the retailing field brings out areas of operation where electronic equipment can provide significant improvement and advantages. The potential for this equipment in the retailing field as a tool for management control should warrant special attention by the industry.

Third, in the evaluation of electronic data processing systems an important consideration should be what they can do in the way of increasing sales and inventory turnover and increased control over operations. While difficult to measure precisely, such advantages, in the long run, are likely to far outweigh the benefits of any immediate clerical or other direct cost reduction. This has proved the case in other industries.

Automation on the Selling Floor

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The word "automation" probably means something different to everyone who uses it. In this article automation means the use of machinery, mechanical objects, equipment or other nonhuman devices to supplement or supplant the work of people. The article is limited to the use of such devices on the selling floor; *equipment used behind the selling scene such as in storage areas, credit departments, marking and receiving departments, etc., is excluded.*

Since selling is essentially a human process involving personal contact between salesperson and customer, it is not likely that automation will ever be as widely adopted on the selling floor as it will in behind-the-scenes or sales-supporting areas. However, it seems likely that the typical retailing executive may never appreciate the promise of automation on the selling floor if he clings doggedly to the belief that "you cannot serve and sell the customer with a machine."

Roughly one half of a retailer's expenses is on personnel. Since this is by far the largest single expense item for a retailer, it follows that anything he can do to reduce personnel expenses or get more for his personnel expense dollar will have a direct and salutary effect upon his profits. A program of automation on the selling floor, carefully planned and executed, should increase a retailer's effectiveness and profits.

In this article consideration will be given to two general areas of automation on the selling floor—simplified selling, including the use of demonstration equipment and vending machines; and the use of mechanical devices to capture data on sales transactions at the point of sale. Brief comment will also be made on miscellaneous types of automatic selling equipment.

Simplified Selling—Nonhuman Help for Salespeople

The success of supermarkets has been in their ability to encourage customers to perform much of the labor involved in selling merchandise. Hence, mechanical and other nonhuman devices adopted by retailers should be mainly for the purpose of lightening the work of *salespeople,* not customers. As long as customers do not feel inconvenienced and do not object to the "work" they must do in a supermarket, there can be little economy in substituting nonhuman aid for duties accepted and performed by customers.

Department stores can improve their selling service by adopting supermarket techniques in *supplementing* personal selling with nonpersonal assistance. Many departments can and should be placed on a self-service basis to free the time of salespeople so that they can do more selling. The Survey of Self-Service Toy Operations in Department Stores conducted by the National Cash Register Company in 1955 indicates how successful and profitable self-service operations can be in department stores.

Packaging for Self-Service. Merchandise that can be selected easily by customers is packaged to sell on a self-service basis. If retailers convert more and more to self-service, manufacturers will be forced by competitive pressures to undertake the expense of such packaging. It seems probable that big-ticket items, complicated merchandise, and small, expensive products will always be sold personally by salespeople and so will not be subject to self-service packaging. But except for these items, the possibilities for self-service operations in department stores seem great.

Self-service packaging is designed to be attractive and draw the favorable attention of prospective customers to the product. Pleasant colors, neat legible printing, and pleasing illustrations are used. Self-service packages are made to be attractive from all sides and angles so that no matter how they are displayed, they will be noticed.

Where possible, self-service packaging will reveal the merchandise so that it can be seen by the customers. Shirts and sweaters in polyethylene bags, semi-boxes with transparent film tops containing hosiery or cutlery, or mesh bags holding toy blocks are examples of packaging that reveals the merchandise.

Self-service packaging is carefully labeled, with a concise statement of customer benefits clearly visible on the outside and a more complete list of instructions on the inside. The price of the merchandise is clearly marked on the package.

If by means of self-service packaging shoppers can find what they want without having to wait and can learn all about the product and its uses and benefits, they will be *better* served than where they must wait for a salesperson with an indifferent attitude to give them inadequate or mistaken information. Department stores can improve their selling efficiency by stocking their departments with more and more products packaged to be sold on a self-service basis.

Open Display. Many department stores have already borrowed proven principles of fixture design from supermarkets, such as self-service wall shelv-

ing, center island gondolas, and pegboard backs and ends. Such fixtures are designed to make it as easy as possible for the customer to get at the merchandise—or to serve herself. Quite often merchandise will be displayed on a gondola so that one sample will be unpackaged and on open display (e.g., a plastic pitcher in the housewares department) at a height of perhaps five feet, with the rest of the pitchers stored beneath —but in sight—and in packages. The customer examines the open pitcher and then takes one in the package.

Large, easy-to-read signs are used in self-service departments to identify different types of merchandise in the department. They can be seen from all parts of the department and substitute for the salesperson in directing customers to the merchandise they are interested in. Merchandise signs are placed on the self-service fixtures to supplement the information given by the visible merchandise and the packages.

LAYOUT FOR SIMPLIFIED SELLING. Experience with self-service departments in department stores has suggested that while there may be more than one entrance to such a department, there should be *only one exit* from which customers "check out." The National Cash Register survey mentioned above noted several reasons for the desirability of the single check out. If a customer is forced to leave from a single exit which is beyond all merchandise displayed, she is exposed to much more merchandise in the department than she would be if she could leave by the nearest exit. Also control over shoplifting is much greater if all shoppers must pass through one exit than if there were more than one check-out area or if merchandise were checked out from a service desk in the center of the department. Even when money is taken for products at a service desk within a self-service department, it is still feasible to have a single check out. For example, in a self-service housewares department, a customer who bought and paid for or charged a food blender at a salesperson-service counter within the department would still leave by the central check-out exit. Her package would have been wrapped and marked as having been paid for or charged so that the fact that the transaction had been recorded could be established at the check-out desk.

RECORDING SALES: CHECK OUT. There seem to be three great advantages of self-service: although a customer may buy several products in a department, she still represents *only one transaction* if all of her purchases are recorded simultaneously at a central check out; salespeople in the department are freed from the routine nonselling function of recording sales and can spend all of their time serving customers and arranging stock; and the customer is not interrupted in her buying mood by having to wait for each item purchased to be recorded. These benefits are provided by the central check out. Open display makes it possible for all customers who know what they want or who buy on impulse to make their selection and check out with no sales help from personnel. This frees salespeople to serve those who need the help most—those who are uncertain as to what they want to buy, or cannot find what they are looking for,

and want more personal attention and service.

Self-service departments of department stores usually operate with regular check-out sales registers and a check-out counter somewhat higher than a supermarket check-out counter (e.g., 40 rather than 32 inches) to facilitate writing. Each check-out counter is manned by a cashier with a wrapper added at peak periods. The cashier records the sale, the machine issuing an itemized and totaled receipt and stub, and takes the money and makes change if it is a cash transaction. The wrapper bags or wraps the merchandise enclosing the receipt stub. If it is a charge transaction, the procedure is the same as above except that the cashier imprints the Charge-a-plate on the receipt, or writes the name and address of the customer on the receipt, has the customer sign the receipt, and stamps on it the department and the fact that it is a charge. For "send" transactions, the customer is given the stub of the receipt, the receipt is placed in the sales register to be sent to Sales Auditing, and the cashier or wrapper makes out a send label with the name and address of the customer. The label goes with the merchandise onto a send truck and then to central wrap. Where samples only are on display, with sales to be delivered from a warehouse, transactions are handled on the sales floor by salespeople in the conventional way, the sales being recorded by a sales register within the self-service department.

One large food chain is experimenting with automatic bagging machines in a few of its supermarkets—the machine automatically loads merchandise into the bag. So far the experiment has been disappointing. Many bags are destroyed by the equipment. Even more serious is the fact that the bagging machines cut down on the flexibility of the check-out operation. Personnel can be built up to take care of check-out peaks, but a bagging machine operates at a given rate of speed regardless of the customer load.

It is also reported that a business machine manufacturer is working on an automatic check-out system for supermarkets, using a color-reading machine. Merchandise would be color-coded when it is received into stock, each color to represent a different price. When items are checked out, they would be put on a conveyor that color-reads and checks out merchandise automatically. This equipment is still in a developmental stage and, to the writer's knowledge, as yet no working models are being tested.

Self-service departments of department stores typically use mesh bags with wooden handles rather than shopping carts for shoppers to collect the items they buy. The following seem to be important reasons for the use of bags rather than carts: since the weight of merchandise is usually not so great for nonfood as for food items, the wheeled cart is not necessary; bags take less room at the entrance and in the aisles; they are more easily returned after being used than carts; and they are not as expensive as carts.

Role of Salespeople in Simplified Selling. Two major advantages tend to result from simplified selling or self-service: (1) the customer is stimulated to impulse and quantity buying by the informative, revealing packaging, open display and near-com-

plete merchandise accessibility and general departmental layout; (2) the salesperson, being relieved of the details of recording numerous transactions, has more time and inclination to *sell* merchandise to hesitant, undecided customers. Salespeople in self-service departments are trained to *watch* customers in the department—not to pester those who are browsing in the department and adequately taking care of themselves, and to approach those who indicate that they need assistance or information. If a salesperson makes the mistake of approaching a customer who is happily examining merchandise on her own, she is likely to be rebuffed with an, "Oh, I'm just looking." Here the entire purpose of simplified selling —having the salesperson serve only those who *need* to be assisted—is defeated. On the other hand, if the "browser" in the department takes her attention from the merchandise and looks for a salesperson, she is obviously asking for assistance and should be immediately and courteously approached.

Evidence that department stores are increasingly appreciating the advantages of self-service is indicated by the announcement in the November 25, 1958, issue of *Women's Wear Daily* that Wieboldt's Stores, Chicago, plans to open a "new type of self-service department store" at one of its present locations in Chicago early in 1959. The store will contain a complete supermarket and "basic sundry items of men's, women's, and children's apparel, drugs, notions, domestics, stationery, and housewares," according to James F. Tobin, Wieboldt president. The entire store, which will not handle big-ticket items, will be a self-service, turnstile store, on a cash and carry basis with no delivery.

Vending Machine Selling

It is estimated that 1.8 per cent of all retail sales in 1958 will be through vending machines; and the *rate* of growth of vending machine sales in 1958 over 1957 is substantially greater than the growth rate for all retail sales. The retail sales increase of 1958 over 1957 is estimated at 3.0 per cent; the similar rate for vending machine sales is predicted at 7.4 per cent. Over the past several years the growth rate for vending machine sales has significantly exceeded the growth rate for all retail sales and seems destined to continue this growth in the future.

Vending machine sales for 1958 are estimated at $2.2 billions, with cigarette sales (forecast at $700 million) the largest single item to move through machines. Other items with large vending machine volume (and in the order of their volume importance) include: bottle drinks, bar-package candy, coffee, cup drinks, milk, postage stamps, bulk candy (gum and nuts), and ice cream.[1] Convenience goods, generally food products, of small unit value, bought frequently and often on impulse seem to characterize most of the merchandise bought through vending machines. About the only soft-good sold through vending machines is hosiery, and the volume of hosiery so sold is insignificant compared with the items mentioned above. What are the possibilities of vending machine use by department

[1] Estimates of 1958 vending machine sales are those of Dr. Peter B. B. Andrews, economist and market analyst.

stores in view of rapid developments in other areas?

THE FILENE EXPERIMENT. In May 1950, Filene's of Boston opened a vending machine "branch store" in the then new Boston Greyhound Terminal to determine the feasibility of supplementing personal selling with machine selling. Called Filene's U-Serv-U Center, the basic items featured were impulse and emergency merchandise. Men's items included T-shirts, briefs, socks, ties, and handkerchiefs; women's merchandise—nylon hosiery, panties and gloves and handkerchiefs; baby pants; and the following miscellaneous items—utility tools, canasta sets, wallets, stationery, cards, jewelry, toys, gift soap, sun glasses, and pen and pencil sets. Another Filene's U-Serve-U Center was planned for the Logan International Airport in Boston to open October 15, 1950.

Filene executives decided at the outset that rather than place vending machines in the store where they would directly compete with salespeople, these should be installed in outside locations. By so doing merchandise would be exposed to people not normally contacted, and hours of operation would be increased. Areas of heavy pedestrian traffic were considered so that the maximum potential of vending machine sales could be ascertained. Boston railroad stations were contacted, but the prospect of direct competition between the U-Serve-U Center and established station tenants put a damper on the negotiations. Downtown Boston subway stations, with great pedestrian traffic flow, were also studied, but the subway areas were so congested that space was not considered adequate for the banks of vending machines contemplated by Filene's. The new Boston Greyhound Terminal, which was also opened in May 1950, was finally selected.

Filene executives worked with two vending machine manufacturers to develop machines suitable for the Center. The machine Filene's used most extensively could store and dispense packages of the following maximum dimensions: 1⅜" deep, 8½" high, and 11¾" wide. Fourteen machines were used in the Center and the cost of the machines plus shielding was slightly in excess of $6,000. The price range of merchandise featured in the Center was from 50 cents to $3.00. The machines would take nickels, dimes, and quarters and various combinations thereof. When the Center was opened, an attendant was on duty at the machines from 8:00 A.M. until 1:00 A.M. His duties included educating customers as to the use of the machines by demonstration and seeing to it that the machines were kept in operating order. By August of 1950 an attendant was on duty only from 3:00 P.M. until 8:00 P.M.

Three merchandising policies carefully followed by Filene's in operating the Center should be mentioned. It was decided that to help the U-Serve-U Center gain consumer acceptance the Filene name—which had and has a great reputation in New England—would be prominently used in the Center. Well-known national brand, Filene private brand, and AMC brand merchandise was sold at the Center. It was emphasized that if merchandise bought at the Center was defective or unsatisfactory in any way, the cus-

tomer could get his money back at any Filene store.

By August many of the problems of vending machine operation had been reduced or eliminated. Machine failures were much less frequent than they had been in May and June. A special box with a view-insert top had been developed for packaging many of the items sold by the machines.

At the end of 13 weeks of operation, sales at the U-Serve-U Center had been about $3,500—enough to cover the direct selling expense of the Center. At this time sales were totaling about $310 per week, and Filene executives said that if weekly sales could be increased to $775, the Center would break even. Traffic in the Terminal was greatly under expectations—a traffic count of 6,800 to 14,000 per day had been anticipated, but only 3,000-4,000 materialized—because as yet the Terminal had not attracted nearly all of the transit-service tenants it had hoped to draw. Had the expected traffic developed, or had the Center been located in a subway station where traffic counts totaled 35,000-78,000, Filene officials were certain the experiment would have resulted in a profitable operation. They were convinced that the results of Center operation clearly indicated that consumers will buy department store merchandise from coin-operated vending machines. At the end of 13 weeks of operation the main problems seemed to be getting merchandise from the store to the machines and cash from the machines back to the store.

Why was the U-Serve-U Center closed and why did Filene's decide not to continue its vending machine operation on such a large scale? It was found that merchandising for the Center was not like merchandising for the store. In selecting items for vending-machine sale, buyers had to look for features that differed from those deemed desirable for conventional merchandising operation. Rather than offering the buyer another outlet for the merchandise he would purchase for the store, the Center *added* another and distinct type of merchandising duty to his responsibilities. Hence extensive vending machine operation was not dropped by Filene's because it was believed it could not be profitable but because of the added merchandising burden placed on buyers. In fact, one Filene executive expressed his personal opinion that within a few years we may see a swing even further toward mechanical merchandising which will bring even more vending machine selling than was experimented with by Filene's in 1950.

RECENT DEVELOPMENTS. Perhaps the main reason why the bulk of vending machine sales has been restricted to inexpensive items is that the machines will take only coins. There seems to be a definite limit to the amount of time a customer is willing to take to feed coins into a machine to buy an expensive item. Two recent developments suggest that the day is close at hand when vending machines will be able to handle currency.

In January 1958, it was announced that Mr. William A. Patzer, president of the A.B.T. Manufacturing Corp., Chicago, had invented a machine that will accept dollar bills, detect them for genuineness and make change. It will take dollar bills in just about any condition and reject larger denominations,

foreign currency, and imitation money. Thus the customer can get her dollar bills changed into coin for use in vending machines by the changer. Future plans are to adapt the changer into a vending machine that will sell merchandise up to one dollar in value and return the correct change when necessary.

National Rejectors, Inc., of St. Louis, has developed a vending machine that, by use of a currency detector, will take dollar bills and dispense merchandise and the correct change. These developments indicate that the bottleneck of the coin-operated machine is about to be broken and that it will soon be feasible to merchandise more expensive products through vending machines. This development will certainly make the vending machine much more adaptable to department-store merchandising than it has ever been in the past.

Future Department Store Use. The results of the Filene experiment seem to suggest the probable future use of vending machines by department stores. They will be used more as appendages to the main store and its branches than as selling mechanisms within the stores. Vending machine centers in areas of heavy pedestrian traffic—such as air, bus, and rail terminals, municipal transportation stations, and ball parks and stadia—will probably be established by department stores. In addition, banks of vending machines may well be in operation after hours at department store entrances and in arcades. Finally, vending machines may be used *in* department stores to dispense some fast-moving merchandise requiring minimum display and demonstration, such as women's hosiery, men's shirts, phonograph records, and books. These vending machines will be able to take currency and to record charge-account transactions when a Charge-a-plate is inserted.

Miscellaneous Mechanical Equipment for the Selling Floor

Dial-A-Style. The Formfit Company, with the aid of the Diebold Company, has developed a mechanical storage-merchandise selling-floor unit called Dial-A-Style. This unit is currently being tested in the second-floor corset department of Carson, Pirie, Scott and Company, Chicago. The unit operates by having the customer make her selection from the corsets on display and then dialing the corresponding number. The dialing causes the trays in the unit to rotate and stop at the style selected by the purchaser. The display is static until activated by the customer.

According to Mr. A. H. Baum, Vice-President of Formfit, success of the Dial-A-Style "has not been spectacular." It is his belief that the Dial-A-Style would be more effective if it were continually rotating so that the motion would attract attention. If this were the case, the dialing would *stop* the movement rather than start it.

Operatorless Elevators.[2] While escalators have practically become standard vertical transportation equipment in department stores, operatorless

[2] Much of the information on operatorless elevators was provided by Mr. H. C. Hickock, assistant to the general sales manager, Westinghouse Electric Corporation.

elevators are a relatively new type of selling-floor equipment. Escalators are quite economical to operate, require relatively little floor space for the amount of traffic they can handle, afford immediate service and service that is fast for two to four floor trips, and are ideal for interfloor traffic. Because most patrons prefer escalators, many department stores transport up to 70 per cent of their vertical traffic by escalators.

Some people still prefer elevator service, and department stores are beginning to convert their elevators to the operatorless type. When an operatorless elevator arrives at the street floor, its door opens automatically, a sign over it is illuminated and reads "This car up," and a recorded voice announces "This car up." This will be the only elevator on the street floor with an open door. As soon as the car is filled, or its dispatching period has elapsed, the doors will close slowly as a buzzer sounds to announce their closing. Whenever a passenger is tardy in entering or leaving an operatorless elevator, her presence in the doorway breaks a light beam which causes the doors to stop and reopen immediately and automatically without any physical contact with the passenger. An elevator car cannot move until its doors are completely closed. Floor buttons are installed on either side of the elevator door so that at least two passengers can select floors simultaneously. The buttons illuminate when pressed to tell entering passengers whether or not their floor has already been selected. A car position indicator is provided to inform passengers of the elevator's progress so that they can prepare to leave as it approaches their floor. An illuminated store directory above the elevator door lists the merchandise to be found on each floor.

Educating the customer in the use of the operatorless elevator and gaining her acceptance of it seem to be the main problems now. It seems likely that this problem will be easily overcome as more and more people try them out once or twice. The number of people who use and accept operatorless elevators is constantly increasing; for example, today virtually all vertical transportation in office buildings is by operatorless elevator. However, there will probably always be a few people who will prefer to use only on a personnel-operated elevator. For such people, perhaps one such elevator should be operated full time or at least during rush hours.

The main attraction of operatorless elevators is that they provide a further retreat for the retailer from the expense and problems of personnel. The salaries, uniforms, and fringe benefits of operators are eliminated, there are no more problems arising from an insufficient number of operators reporting for work or from discourteous, lackadaisical behavior by operators. It has been estimated that for department stores the cost of change-over to operatorless elevators can be amortized in roughly 20 years.

Some department stores using operatorless elevators successfully at present include: Marshall Field & Co., Chicago, which has had five operatorless elevators in operation for some time in their Men's Store; Filene's, Boston, recently completed installation of a bank of four operatorless eleva-

tors serving eight floors; Famous & Barr Company, St. Louis, recently installed a bank of six operatorless elevators and is presently changing over six more; the Emporium, San Francisco, is now operating four operatorless elevators; Rike-Kumler Co., Dayton, has had three in operation for more than a year; and the May Company has installed five in their Denver store.

THE AIR DOOR. For retailers who would literally like to greet their customers at all times with an open door, the Air Door is the answer. The Air Door substitutes a curtain of air for conventional doors at retailers' entrances. The principle of the Air Door is not new: its original patent application in the files of the U. S. Patent Office dates back to 1903, and the idea was developed commercially in Switzerland about six years ago. Previously the idea had been used mostly in industrial applications. But recent improvements in air-handling equipment and controls and the increased level of economic activity have made the Air Door feasible for commercial use.

Basically an Air Door consists of a filter, blower, heater, discharge grill, and floor grating. The Air Door itself is invisible; customers literally enter and leave a hole in the store—protected by a screen of filtered, heated air. The air is sent downward through the discharge grill—guide vanes "aim" the air at the proper angles so that winds and drafts can be kept out of the store—to the grating on the floor of the Air Door. After passing through the floor grating, the air is filtered and cleaned, sent to the blower which moves it back to the discharge grill where it is ready for another trip. Equipment for the Air Door is placed at the side, above, or below the door opening, depending upon space requirements. Side installations are the most convenient from the standpoint of getting to the installation. The only parts of the Air Door visible to customers are the discharge grill and floor grating. Conventional doors can be slid from slots in the walls on either side of the door space into the doorway when the store is closed. Standard Air Door heights are eight feet, with the present maximum height being 12 feet. Air Doors higher than 12 feet can be engineered on an individual basis. Unobstructed widths up to 20 feet can be supplied; theoretically there does not seem to be any limit to the width of an Air Door.

The cost of operating an Air Door depends upon the size of the opening, outside temperatures, and wind velocities. The manufacturer of Air Doors, New Castle Products, Inc., New Castle, Indiana, reports that tests made on a five-foot unit in the midwest during the winter months showed a cost of about 5 cents per hour per foot of opening. Temperatures were as low as −6° F during this period. During the summer months, operational costs would be very low.

The Air Door provides several benefits to the retailer. The customer can leave the store with her arms full of packages and not have to fight her way through heavy swinging and revolving doors. Studies have shown that the the ratio of traffic flowing through a door is more than five to one in favor of the Air Door over conventional swinging or revolving doors. Users report that heating and cooling costs are greatly reduced where Air Doors

are substituted for conventional doors. Under normal conditions wind will not penetrate the Air Door, and it is far more effective than conventional doors in preventing drafts even near the door. Rain or snow is kept out of a store equipped with an Air Door so long as the wind velocity is less than that for which the unit was designed. The floor grating removes snow, slush, and dirt from the doorway, thus preventing a messy entrance. The automatic operation of the Air Door causes it to compensate for temperature or wind velocity changes either inside or outside the store.

The F. & R. Lazarus Company, Columbus, Ohio, has had an Air Door as its main entrance for about one year. Lazarus executives report that the installation has been successful.

GRAVITY FEEDING. The nearest thing to an automatic stocking device is a gravity feeding system reportedly developed by the Grand Union supermarket organization. This is a display arrangement which is inclined downward so that merchandise can be fed into the display from the back by means of the force of gravity. An executive of a midwestern food chain told the writer that his organization had tried but abandoned gravity feeding. It was believed that there was not enough "facing" of merchandise where gravity feeding was used. The impact of mass display upon the customer was vitiated by the gravity feeding system. Then there was the problem of what the customer should do with an item she selected from a gravity feed unit and decided she did not want.

This organization is also experimenting with inclined display shelves with rollers on them to keep merchandise down forward on the shelves. These shelves are being used particularly with baked goods. So far, results of the experiment are not very favorable: the equipment takes more space than ordinary shelves so that sales per square foot are lowered; the roller-type shelves are more expensive than regular units; and more labor is required for keeping the roller-type shelves stocked.

TAPE-RECORDED SALES TALKS. Woolworth's has experimented with tape-recorded sales talks at some of its women's hosiery counters. Periodically, by means of a tape recording, a mechanism gives the customer-listener the selling points of a particular type of hosiery which Woolworth's is pushing.

Electronic Data Processing

PUNCH CARD SALES CHECKS. Some department stores are recording sales on three-part sales checks consisting of an IBM card, tissue copy, and customer copy and address label. The sales ticket, which is prepunched with a salesbook and ticket number, is further punched with the information written on it. This makes it possible for accounting machines to read, write, and remember the information punched on the sales tickets. With a collator, card punch, sorter and accounting machine, a department store can perform its entire sales audit procedure with the use of punched sales tickets. The accounting machine can write up-to-date statements of account for customers promptly. Aging analysis of accounts can be prepared at the same time they

are being billed. Detailed figures on purchases and payments can be provided to customers at the time they are billed. Inactive accounts can be systematically followed up, and all records can be kept in one central place. All of this can be accomplished with one half the average personnel of the credit department according to Mr. R. M. Bozeman, Credit Manager of the White House, El Paso, Texas, which has been using an IBM sales ticket system for more than two years. To give some idea of the personnel saving resulting from such a system, two quotations from Mr. Bozeman's talk at the 25th Anniversary Credit Management Division Conference of the N.R.M.A. in April 1958, are given. Referring to the machines used in conjunction with the punch card sales check system of the White House, he said: "The machines occupy a floor space area 15 x 30 feet. With this equipment two employees perform the clerical duties of payroll, sales audit, accounts payable, merchandise control, accounts receivable—billing and aging, credit control of overlimit accounts, delinquent account form reminder preparation, and some of our direct mail credit sales promotion." At another point, speaking of the credit department of this $6-million-volume store, Mr. Bozeman said, "We reduced our force from 26 to 11 people upon our conversion to automation."

Punch Card Unit Control. Both Dennison and Kimball print punch price tickets and can be converted either to Sperry Rand or IBM cards. For example, a single punch price ticket, when processed through an IBM Ticket Convertor, produces a punched card which contains all of the information recorded in the price ticket plus whatever additional information of a fixed nature is desired. Conversion from a price ticket to a punched card is done at a rate of about 6,000 cards per hour by IBM. Sales, inventory, and on-order information by classification, manufacturer's number, color, vendor, department, price, etc., can be tabulated in report form weekly or even more frequently if desirable. In fact, daily sales reports by classification, manufacturer's number, style number, color, etc., can be prepared for the buyer to indicate customer buying trends and changes in consumer demand. The machine of one company in this field can post to this type of record at the rate of 3,000 complete lines per hour.

One midwestern department store reporting in the 20-to-50-million annual sales group—with a punch ticket-punch card unit control system in over half of its selling departments—reports that the number of unit control clericals eliminated from their operation has provided a saving which has more than offset the cost of mechanization. The store also reports a great saving in inventory investment as a result of its electronic unit control system.

Why a Punch Card System. Those who favor a punch card system of recording sales and unit control information maintain that the objective of mechanization is not to capture information at the point of sale but to process data so that it can be used efficiently in the payroll, sales audit, accounts receivable and accounts payable areas. They argue that the cost of experimenting with mechanical merchandise control can only be justified

by savings in the areas previously mentioned, particularly in accounts receivable.

A handwritten sales check will tie up a cash register less than where it is taking a large amount of merchandise information and recording it on a tape. Hence, where a cash register is so tied up, a bottleneck may result in a heavy volume department. Cash registers with tapes will record merchandise, payroll and sales information; except for customer account numbers on charge sales, they will not capture accounts receivable information. Since the largest savings are obtainable in accounts receivable, punch cards that will speed operations in that area are even more desirable.

POINT-OF-SALE ELECTRONIC REGISTERS. Machinery has been developed to "capture" information at the point of sale and put it on tapes which can be fed to computers which can "digest" the information and print merchandise reports. Examples of this machinery are the Sales-Tronic of NCR and The Sweda Point-of-Sale Registers. The Sweda machines, with punch tag attachments or paper tape outputs, record data as to type of transaction, merchandise classification, taxes, and sales by clerk either on punched price tags or on paper tape. The punched price tags or paper tape can be translated into sales audit, sales by clerk, or merchandise classification reports by most types of data processing equipment.

The complete National Sales-Tronic System consists of a Sales-Tronic Register, Media Reader, and National Tape Recorders. All details of the sale entered in the Register are electrically punched in paper tape as the sale is recorded. The Media Reader takes the data on Dennison or Kimball punched price tags, customer's credit plates, and salespeople's tokens and transfers this information electrically to the tape. The Tape Recorder punches all information received from the Register and Media Reader to a paper or magnetic tape, whichever is being used. All of the data, in punched tape form, from the Sales-Tronic Register and Media Reader can be processed on any of the standard types of processing equipment. The following illustrate the types of reports that can be electronically prepared as a result of all the information collected at the time a sale is registered: vendor analyses, daily merchandise summaries, slow-selling and potential markdown reports, daily best seller reports, and on-order reports. The Media Reader can also be used to take inventory—with no necessity of recording figures on paper with pencil. The Media Reader takes information from punched price tags on the merchandise and it is punched into tape by the Tape Recorder. Inventory reports can then be prepared by processing the punched tape with data processing equipment.

ELECTRONIC DATA PROCESSING EQUIPMENT—PRESENT AND IMMEDIATE FUTURE. Electronic data processing systems and equipment of interest to retailers are still very much in the formative stage. Many stores and store associations are still experimenting in this area, looking for efficient ways to adapt and use this equipment. At the present time, however, many retailers seem reluctant to commit themselves

completely to a program of electronic data processing.

The equipment is expensive, and few if any retailers want to mechanize just for the sake of mechanizing. And the savings resulting from the use of this equipment must be substantial to justify its expense. There is also the problem of rendering cash registers—which represent a major investment in most stores—obsolete. Unless new electronic equipment to replace cash registers promises *dramatic* savings, it is unlikely to be purchased by retailers. Electronic data processing systems developed for retailers over the next two or three years are more likely to be designed to adapt the cash register for use as a part of the system. For this immediate future period (i.e., the next two or three years), a system such as the Ticket Convertor—punch card method or the Sales-Tronic Register would seem most feasible.

The speed with which changes are taking place in the area of data processing equipment for retailers will probably slow down the pace of conversion to such systems by retailers. The reliability of some of the high-speed computers currently being tested in some stores has not been definitely established. Once reliability has been established and production of such units can be increased as their demand strengthens, their selling prices should come down rather precipitously. The controller of a large midwestern department store told the writer that the price of one unit dropped from $3,500 to $2,000 "in short order," as he put it. Until the reliability of a given electronic data processing unit has been established and until the price structure for such units becomes a little more firm, it seems unlikely that many retailers will invest significant sums in such machinery.

A third factor which may act as a deterrent to the adoption of electronic data processing systems by retailers has to do with the performance and cost of the stock control function. One department store executive estimated that about 50 per cent of the stock control work in department stores around the country is performed by buyers on their own time—or at a time that is "free" from the store's standpoint. If this is so, there may be some question as to why a store would want to invest a large sum of money in a stock control system that would provide it with a service it is presently getting "for free." On the other hand, it should be pointed out that as buyers' responsibilities increase with the growth of multiple branch operations, more of their time *should* be freed for buying and selling activities.

THE ULTIMATE IN DATA PROCESSING EQUIPMENT. When the recognized "kinks" in present-day data processing equipment are ironed out, what will such systems look like? What do department store controllers and business machine manufacturers envisage as the ultimate toward which present efforts and research should be directed in the development of a really effective system?

The goal seems to be a system that will provide *direct access* from sales floor equipment to computers. With such a system all sales and stock control information would go direct from the selling floor to the computer, where it would be processed, rather than hav-

ing to go on tapes or punch cards which are then taken to a computer. Such a system might do some of the following things. The computer would automatically send back direct authorization to the selling floor on charge sales. Charge accounts would be updated by the transaction as charge sales were fed direct from the floor to a central computer. If stock control information went direct to the computer, a buyer would know immediately when she was out of an item. This would be particularly helpful in taking telephone orders as well as for "sends" to be delivered later—no more such orders would be taken after the computer "signaled" to the floor that the item was out of stock. The name of the salesperson handling the transaction would go direct to the computers so that commissions could be immediately computed.

Short of such a direct access system would be a register on the sales floor that would print sales, stock and credit information, and convert this information to cards by optical character sensing. A charge plate would be used with this register, and information for the Accounts Receivable Department could similarly be prepared for a computer by optical character sensing. For merchandise, sales, and commission information, this new register could scan the sales check or adding machine tape and transcribe the data onto a magnetic tape where it would be ready for a computer.

It is entirely possible that such a register will be developed within the next two to three years. One domestic company has already developed a machine that reads individual cards by means of optical character sensing, and a British firm has produced a machine that will read adding machine tapes in the same way.

Because new registers of the type described above would add greatly to sales register cost and make present registers obsolete, it seems likely that these new systems will first be installed in branch stores. Then depending on how efficient they prove to be, parent stores will gradually or more rapidly convert to these systems.

Predictions for 1965

The customer walks through an invisible curtain of air and passes from the 95° temperature outside into the 75° temperature inside. She takes an automatic elevator to the sixth floor where she goes to the Housewares department which operates on a self-service basis with check-out counters. She selects a coffee maker from a merchandise gondola and takes it to the check-out counter, deciding to charge it and have it delivered. Unknown to her, the sales register receives authorization for the charge (as a result of the cashier putting her Charge-a-plate in a special slot in the register) and sends complete information about the transaction back to a computer which up-dates her account and includes her purchase in all sales and stock control reports being currently compiled on the day's business.

After leaving the Housewares department, our customer takes an escalator to the fourth floor where she visits the Foundation Garments department. After examining several girdles on display, she selects the desired size,

color, and style by dialing the number representing her choice. The display mechanism, which has been rotating, is stopped at the place where her selection is located and the packaged girdle is ejected. This transaction is recorded in a similar way as the one described above except that this department is not on a self-service, check-out basis. (About one fourth of the departments in the store are self-service.)

Our customer of 1965 next boards another operatorless elevator and goes to the first floor. She stops at the Men's Furnishings department on her way out of the store and buys a shirt for her husband from one of the vending machines which sell the fastest-moving sizes, colors, and brands of men's shirts. She charges her transaction by placing her Charge-a-plate in a special slot in the machine. This action on her part causes all information concerning the transaction to be electronically relayed to the Sales Audit, Accounts Receivable, and Stock Control departments.

After having dinner and going to a movie with her husband, our customer recalls that she did not buy any hosiery at the store as she had planned. On the way to the garage where their car is parked, she stops in the lobby of the entrance to the store and purchases a pair of hosiery from a vending machine which takes her currency and returns the proper change.

Present developments in the area of selling-floor automation suggest that this may well be the picture of department-store selling in 1965 and probably before. Whether or not the full benefits of selling-floor automation are enjoyed by retailers in the immediate future depends upon their ability to visualize the possibilities and their willingness to act decisively to exploit the benefits of selling-floor automation.

Promise of Automation in Accounting and Control

RALPH H. ELY, JR.

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The author describes punched tape as the common medium to link the records of various departments. He stresses the importance of step-by-step conversion to automation, with introduction of one system at a time to do a desired job and then fit in with future machines as they are installed throughout the store. Even the common adding machine, equipped with punched tape and related to inexpensive machines in various departments, can be the starting point for a steadily expanding program of automation. Due regard is urged for the interrelatedness of departments and for the human factor which will be present no matter how many new machines are invented.

Automation is a challenge to retailing!

It is evident that there does exist a need and a strong desire on the part of all retail managements continually to improve operating techniques, the prime objective being, obviously, an improvement in profits. Increased competition, coupled with mounting expenses, demands an open-minded approach to automation.

The past century has seen an evolution from slow manual systems of record-keeping to speedier, controlled mechanical methods. Now we are on the verge of entering the era of electronic speeds in record-keeping. Retailers have met the increased demands of record-keeping by using improved business machines. However, the volume of paperwork has grown faster than the capacities of most existing systems, and costs have risen commensurately. In 1900, one out of every forty employees was engaged in clerical work. Today this ratio has changed

to one out of six. The consequences of this trend appear on the P & L statements.

Recent statements by two controllers are typical. One said, "Our only salvation to combat increased operating costs is to mechanize our system and apply the principle of automation in every possible area."

Another said, "In order to assure adequate merchandise stocks in our main store and branches, it is apparent that we must apply the techniques of automation to our merchandise control operation. We are compelled to maintain adequate stocks at the lowest capital expenditure."

Breakdown of Store Areas

A rapid rundown of possible areas for automation would include the following mechanized or partially mechanized systems:

1. Floor audit or sales register audit, depending on preferred terminology
2. Simplified salescheck plans or register receipt plans
3. Cashier-wrap stations
4. Conveyor systems
5. Self-service departments
6. Incentive plans for salespeople
7. Merchandise control systems
8. Payroll systems
9. Accounts payable and accounts receivable systems: "pay bill" systems
10. General accounting

Considerable progress in automation has been made in store service, such as escalators, in-store layout, flow of traffic in the receiving department, and on the selling floor. These are beyond the scope of this article, however. Two main areas are to be considered here: (1) accounting and record-keeping areas, where transaction controls are established and later processed for required operating statistics; (2) merchandise control.

Punched Tape

What may be termed a "common denominator" of all media is punched tape, that increasingly familiar strip of paper with the configuration of holes punched in it in code. If retailing has a common language media, punched tape is it. The tape can be punched by a wide variety of machines, yet in the end the tapes flow to a common point and are processed similarly. If processing is to be done by a computer, the tape serves as direct input to a high-speed paper tape reader. If processing is to be handled on tabulating equipment, a tape-to-card converter can be used.

Punched tape has several important advantages. It is inexpensive—a 1,000-foot roll of tape capable of holding 120,000 characters of information costs about 75 cents. Punched tapes are easy to store. Punched tapes are easy to mail, or data may be transmitted by teletype to a central processing headquarters. The cost of tape recorders is low, and it is often feasible to equip branch stores or other facilities with separate units.

Paper tape recorders have been available for some time, but only in the past year or so have they gained popularity as one of the most useful business machines yet devised. Recorders have been successfully installed in financial institutions and in industry

and are now spreading to department stores.

Built-in safety features insure the correct preparation of data by tape recorder. This is particularly important because of the well-known auditing fundamental that states: final reports are never stronger than the record of original entry.

The familiar adding machine, when equipped with a punched paper tape recorder, can produce valuable reports in such departments as receiving and shipping; sales audit; inventory; accounts payable distribution; expense analysis; payroll and related distribution; departmental sales reporting; markups and markdowns; and purchase order analysis.

An adding machine with tape recorder is an extremely accurate and fast method of input. Its operation is simple and does not require specialized or highly trained operators. Any or all entries may be captured in punched tape, and the tape may then be processed automatically through other equipment to secure final reports.

As a further example of versatility of the adding machine, it can also be linked directly to a card-punching machine via an intercoupler. The tandem setup produces punched cards direct, without making a tape necessary.

"Sales-Tronic" System

The heart of a "Sales-Tronic" system is a three-unit combination of machines, all located at the point of sale. The three units are a sales register containing all fundamental features of the modern register; a media reader designed to read data from prepunched price tags and also from clerks' tokens; and a punched tape recorder which captures information entered in the sales register and the media reader.

A "Sales-Tronic" system is flexible. Its installation depends on a store's requirements. If unit control is not desirable, the media reader need not be used. The setup in that case would consist of only two units at the point of sale—the "Sales-Tronic" register and the punched tape recorder.

A feature called "sequence control" enforces the correct original entry by the salesperson and simplifies training. The result is that all necessary data about a sale—type of transaction, department, classification control, salesperson, stock number, and so on—is converted to the common-language punched tape as the sale is made. In other words, detailed information is collected as a by-product of performing other necessary operations, and the information is in a form that permits subsequent machine processing.

It is noteworthy that the programming of a "Sales-Tronic" system is also flexible, not rigid. This permits a store to make a department-by-department plan of automation without strapping a store to a single machine program. A store is able to secure accurate and timely data in a practical usable form, at a minimum of expense.

Other Systems

Tape recorders may also be linked to window posting and analysis machines, as well as to the versatile typewriter-bookkeeping machine.

Noncarriage machines have proved best for pay-bill desks, sales analysis,

sales audit, layaway, budget, and time payment. Carriage machines are better adapted to accounts payable, accounts receivable, payroll, inventory control, and general accounting.

Requirements of specific jobs may vary, but one paramount fact stands out: punched tape or punched cards may be created as a by-product of original entry. Thus, automation on the selling floor is matched by automation in central accounting, both with the same common media—punched tape.

Importance of First Step

This general outline of equipment available for installation today has been made for a twofold purpose. First, it shows that business machines must be compatible with each other. If the goal of an integrated data processing system is the generation of all required reports without human intervention following the creation of the original entry, then it follows that the various units in the system must speak the same language; punched tape satisfies this requirement.

Second, the outline presents equipment now available in a framework on which initial planning can begin at once. The importance of beginning a step-by-step program has not received adequate publicity, in my opinion, chiefly because generalized thinking has tended to confuse rather than clarify the issues.

Several advantages flow from a store's decision to begin an automation program, some practical, some psychological. Sound practical experience is gained, for example, from a store's original survey and analysis of its system. Automation requires studies of installation costs, including training of personnel; studies of operational costs; and studies of programming requirements, including costs of subsequent changes; and in all of these steps the management group is dealing with a new language. In a step-at-a-time plan, store personnel become conditioned to change, and the reasons for it. There is no tugging and pulling at new methods but, instead, active cooperation.

It is a truism that any new system must have the active support and encouragement of top management. Enthusiastic interest on the part of management is going to percolate down rapidly to the rank and file. A successful installation in a particular department is going to engender confidence in automatic systems among all echelons of personnel, and firm plans can be made for the complete automation of the selling floor.

A Look into the Future

National's Model 304 Data Processing System, now in production, is a computer system designed to reduce hours to minutes in the handling of a store's record-keeping. An electronic computer will provide for retail managements even greater benefits, principally because of the urgency to have available up-to-the-minute information for merchandise control. Future electronic systems will relieve the buyer of much of the drudgery of record-

(*Continued on page 62*)

European Merchants Look at Automation

DEREK KNEE

International Association of Department Stores, Paris

What progress have European stores made in adapting the latest developments in data processing, materials handling, and automatic vending to their needs?

The secretary of the International Association of Department Stores cites many instances of specific and varied use. He shows that European merchants may have been more cautious in adopting the new techniques than Americans, but they have certainly not been slower or less thorough in their investigations and experiments. Judging from the case material presented here (and not just from the editorial comment), it would seem that perhaps European stores have gone as far as, or further than, American ones in installations and research. Certainly they are asking the challenging questions which must be explored before any wide-range action is taken.

A number of the most progressive European merchants, like their American counterparts, are looking at automation. They are taking part in private and public discussions of the whole matter, as was demonstrated at the recent Business Computer Symposium in London, and they are studying possible applications to their businesses. In some cases they envisage reorganization of structures and procedures and are undertaking case studies.

With a few notable exceptions, however, they have not yet decided to undertake the large-scale investment in new equipment implied in almost every form of automation. Except in a comparatively small number of important firms, the stage of thinking about the problems involved has not yet given way to the stage of acting on conclusions reached. The aim of this brief report is, therefore, to say something on what these relatively few firms are

doing and on what other firms are planning.

Varied Avenues of Approach

The approach of European retailers to automation has so far been along three main lines, as follows:

1. Possible applications of automation to the selling process itself, by means of automatic vending, various forms of mechanized self-service, and so on. This approach finds its typical expression in the coin-in-the-slot machine.
2. Possible applications of automation to the materials-handling side of retail distribution. Automatic equipment has been developed to transfer merchandise from one place to another and to undertake various other processes, such as sorting, checking, and breaking bulk, during these transfers. The typical motif of this approach is illustrated by the monorail conveyor.
3. Possible applications of automation to the recording and processing of information about store operations of every sort, particularly by means of electronic equipment. This third possibility is generally regarded as the most important and the most fruitful. It is typically seen—in oversimplified fashion perhaps—as an electronic computer.

Automation in Selling

In spite of the attention given for many years to the theoretical possibilities of making selling automatic, European retailers have not yet gone very far in this field. The development of automatic vending machines generally remains much more limited than in the United States.

While there are isolated examples, particularly in Germany and the Scandinavian countries, of machines being used to sell a few staple non-food lines such as stationery and nylon stockings, their use is still largely restricted in other countries to such categories as cigarettes, candy, and fruit. To date, the automatic vending of meals and beverages in restaurants and canteens has been used on a much smaller scale than in the United States.

This hesitancy about putting automatic selling into operation arises not so much from any lack of technical know-how as from economic and commercial considerations. The memories of a long period of unstable retail prices and currencies have died hard. The problems involved in prepackaging, pricing, and the selection of the most appropriate items have been considered seriously only in recent years, and many European retailers are still reluctant to abandon irrevocably the traditional personal contact between customer and salesclerk.

This last point of view is being steadily undermined by the growth of self-service and the growing confidence of European consumers in this method of selling. Self-service in food retailing, after a somewhat hesitant start, is gaining ground very rapidly in Europe. Once self-service retailing has paved the way, automatic selling can come into its own in many lines of merchandise.

There are many indications of future developments. Among these is the Frankfurt bookshop which has decided

to display paperback editions on a conveyor belt which passes in front of customers, who have the possibility of pushing a button to stop the belt as soon as they spot a title which interests them. Another firm in Manchester, England, plans to open a fully automatic shop which would sell everything from a pair of nylon stockings to a joint of meat by slot-machine techniques. The "Automat" machine for displaying and selling an assortment of 160 books was on show in London at the beginning of 1957, and in Birmingham, England, a "Vitrinomat" occupying the whole of a display window was installed in 1956 to sell many different merchandise lines. The large-scale retailers of Europe are not generally involved in these projects, however.

Progress along these lines is not likely to be rapid except in those categories of merchandise, such as cigarettes, where automatic selling is already an accepted feature. Apart from all the other considerations involved, there are still in some countries legislative restrictions on automatic selling, aimed either at preventing this type of selling as such, or at maintaining other legislation concerned with store-opening hours, public health, etc.

Materials Handling

In the movement of merchandise by automatic means, rather more has been achieved by European merchants, although here, too, developments have so far tended to lag behind those in the United States. In this field the lessons of American experience are awaited most keenly by Europeans, and recent reports from the United States have aroused considerable interest. In particular, the new systems adopted by such American firms as Mangel Stores, Diana Stores, Montgomery Ward, and Alexander's in New York are being closely studied for their warehousing and handling operations.

In Europe itself, the lead in this field has been taken by the German mail order house "Die Quelle," where a completely automated system for filling and despatching orders has been in use for almost three years. The conveyor and rail systems for transporting merchandise are controlled from a central desk, and the packing of orders takes place on a conveyor belt which is automatically unloaded. The plant costs some four million dollars and can handle up to 100,000 orders a day. Since its installation, an electronic accounting system has been added.

Other pioneers in automatic materials handling are the C. and A. group of ready-to-wear stores, which operates chains in several European countries, and the Swedish "Hemköp" organization which sells foodstuffs by direct delivery to customers' homes on the basis of telephone orders.

Some other large-scale retailers in Europe have tended to reject a fully automatic system of handling merchandise in favor of a carefully planned but only semimechanized system which they regard as more flexible and therefore better able to cope with the wide assortments and marked fluctuations which are characteristic of their businesses. They have preferred to reorganize their warehousing and install a variety of mechanized or semimechanized equipment in order to streamline

their materials handling while keeping it flexible. Successful examples of this approach are reported from the Migros warehouses in Switzerland, from the two Belgian department store firms of the Grand Bazar in Antwerp, and the Innovation in Brussels, both of which have new warehouses planned largely on the basis of American models, and from other large retailers in Great Britain and Sweden.

Apparently, the rapid and smooth flow of merchandise in retail firms has not proved a serious difficulty, provided that the information, statistics, and written data which ought to accompany the merchandise moves equally rapidly and smoothly. The bottleneck often occurs in administrative procedures, and if these are reorganized to speed up the flow of information by electronic or other means, retailers may see a correspondingly increased need for complete automation in materials handling.

The Recording and Processing of Information

European retailers have introduced automation most widely into the recording and processing of information necessary to the management of their businesses. They have been faced with steep rises in the costs of clerical labor and with great difficulties in recruiting office personnel in a period of full employment, particularly for monotonous or repetitive jobs. With the return in the last five years of conditions of severe competition, they have become increasingly aware that the information on which they base management decisions is often inadequate, inaccurate, or too late in arrival. They have admired the way banking and insurance companies have introduced a measure of automated procedures to handle the mass of data involved in their transactions, thus cutting their labor costs as well as improving their management methods. Many retailers are conscious that their own activities are less easily susceptible to automatic treatment than the routine operations of banking, insurance, or public administration, which for this reason have tended to receive preferential treatment at the hands of the manufacturers of electronic and other equipment. There is growing awareness that conversion to automatic procedures, particularly in retailing, involves not only a high investment cost but also a lengthy and costly period of research, reorganization, and "teething troubles."

But while there is real excitement about the possibilities offered by electronics in retailing, large European retailers do not see improved and automated procedures solely in terms of electronic equipment. They are as yet rather reluctant to abandon other systems with which they have become familiar and which have proved their worth. In most European countries there are large retailers with extensive experience of punched-card systems; in some cases these systems have recently been modernized and converted to new uses in the belief that, while they may eventually be superseded by electronic methods, they not only carry out their jobs effectively for the time being, but also provide, as nothing else could, the training and experience for clerical staffs and executives who may one day be called upon to administer

even more complicated systems. Present-day punched-card installations often bear little resemblance to those used in the thirties; such techniques as the use of print-punch tags of the Kimball type have greatly increased their usefulness in such fields as the recording of sales and stocks, while other new developments such as mark-sensing have made them infinitely more flexible.

Of particular interest in this connection are the moves by the Kaufhof department store chain in Germany which has recently introduced punched-card accounting for some of its merchandising operations, including the placing of orders by its branch store buyers direct on mark-sensing cards. These are then processed to give a full breakdown of orders for the whole firm automatically and rapidly. They likewise facilitate the centralized and equally automatic payment of suppliers' invoices. These and similar moves have great significance for chain organizations of any sort since they indicate the possibilities that exist, without necessarily going in for electronic equipment, of the decentralized recording and the centralized processing of information.

This is not to say of course that no action is being taken to introduce electronic methods into European retailing. The German mail order house, "Die Quelle," which has already been mentioned, has a complete electronic system in operation, working in conjunction with its mechanized handling procedure. Several other firms, including variety chain stores and consumers' cooperatives, have ordered electronic computers, which will be used for a variety of tasks. The Littlewoods organization of Liverpool, England, a mail order and variety chain store firm, is using a National-Elliott 405 computer for stock control. According to the principles adopted from the outset by the firm, the computer reports on those items of merchandise which deviate from certain standards and then allows the merchandising executives to decide what action may be necessary.

An even more interesting example has just been reported from the Boots organization of Nottingham, England, drug manufacturers and retail pharmacists with 1,300 branches throughout the country. The firm is installing an Emidec computer in order to keep track of the 60,000 items of merchandise stocked at its warehouses. In addition, it is completely reorganizing the systems in use in its stores by means of several thousand specially modified Regna cash registers, the tapes of which will then be read at its headquarters by the ERA (Electronic Reading Automaton) equipment developed by Solartron. This seems to be the first time that direct reading has been employed by a retail organization on the recording and processing of data about the sales transaction.

What is significant about these developments is that they are all setting out to use modern mechanized techniques on procedures which form part of the merchandising operations of the firms concerned, rather than starting by trying them out in auxiliary operations such as the payroll of the personnel. It is a measure of the progress in thinking among the more advanced retailers in Europe that they now tend to reject as unsatisfactory the experiences of those industrial

firms which have installed electronic computers in order to save money on routines such as payroll, and to search for the still rather rare examples of organizations which have been able to use these techniques for commercial operations.

The fact that merchants want to use automation in buying and selling, rather than in other less complicated fields, however, has posed problems which have not yet been completely solved and may account for some of the delay in realizing more practical applications. Since the recording of information on retail operations starts from the sales transaction, merchants have been greatly concerned with the problem of input in the selling department, a problem which the point-of-sale recorder (as already in use in the United States), has not yet solved to their entire satisfaction, partly because of the cost of the equipment and partly because of the rigidity which it seems to imply in a rapidly changing type of business. Prototypes of point-of-sale recorders have been demonstrated in Europe, and experiments with them are now in progress, notably in France and Sweden. Several large retail organizations in Europe now consider that the final answer to their input problems may lie with the sort of direct reading device being installed by Boots, the Solartron ERA, or the new Sweda E 3 Audit Roll reader, on which other experiments are now taking place.

These are some of the many considerations now being taken into account by European merchants, some of whom have spent several years looking at the problems and possibilities. Of the several study groups working in this field some have had the advantage of being able to call on American experiences and are hoping in the future to learn even more lessons from the United States. In addition they have learned from the pioneering work done by the catering firm of J. Lyons in London, which as long ago as 1954, installed its computer LEO I (now superseded by LEO II), and used it for recording and tabulating orders, accounts, and statistics for the 150 shops and factories of the company. They have been concerned, however, with more than just the systems, the costs, and the "hardware," since they realize that automated procedures involve radical changes in operating methods and organization structures and may even entail the rethinking of policies which have been accepted for years as unchangeable. They also realize the immense job to be done in training and educating their staffs and executives in the new attitudes necessary to be able to use such procedures with success.

Conclusion

This brief report reflects the thinking of only a very small proportion of the several million retail merchants of Europe, but a proportion whose influence bears no relation to their numbers. By their investment of time, money, and research effort they are preparing to lead European distribution into new directions. The European merchant is perhaps more conservative than his American colleague,

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Automation and Mechanization of Materials Handling

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What is the difference between automation and mechanization in materials handling? What are the various approaches to automation? In what areas of materials handling will automation be most effective?

These and other questions are explored, with numerous case illustrations.

Materials handling in retail stores is very much undeveloped and offers great potential for improved efficiency and cost reduction. It is significant that until 1956 there was no category for warehousing or materials handling in the expense breakdowns of the Controller's Congress or Harvard annual reports on department store operations. In the last two years, a "Materials Handling" expense center has been introduced into the Harvard report as a development of "production unit" accounting, but as yet reporting is incomplete. Harvard reports for variety stores and grocery chains do contain warehousing data, but materials handling is broader than the warehouse.

It is considered by many that retailing is not amenable to automation in materials handling, or to much in the way of automatic equipment, or even to much more efficiency. It is alleged that retailing is too small, too fragmented, too diverse in items carried, and deals with too many customers on an individual basis ever to expect much in the way of improvement.

In its handling problems, retailing is basically a warehousing function. There is no *processing or converting* of raw or semi-finished materials. There is receipt, sorting, checking and marking, storage, order picking, order assembling, packing, shipping, delivery. Spectacular advances in industrial processing are not comparable. Yet, in large department stores materials-handling costs were reported at 2.45 per cent of sales in 1957. Additional

stock-keeping and packing functions would increase this to 3.5 per cent, or approximately 10 per cent of the expenses. Warehousing amounts to net expense of about .5 per cent in large variety chains and 1 per cent in smaller ones. In chain food operations warehousing constitutes about 1.5 per cent. These sums are striking in view of the continuing squeeze on profits. There must be improvement in these areas, particularly in department stores.

Automation Defined

Automation of materials handling must be distinguished from mechanization. Mechanization, in essence, substitutes equipment to perform a function previously done by human labor. Automation substitutes controls to provide automatically the decisions previously made by human minds. In the course of introducing automatic controls in materials handling, it generally is necessary to introduce mechanical equipment, such as conveyors. It is not, however, inevitable.

The System as a Whole

Automation should begin with a complete system or integrated approach to the materials-handling function. The purpose of materials handling in a particular installation must be analyzed if controls and decisions are to be built in. Size of assortments, depth of stock, speed of delivery to customers, perishability or seasonality are some of the considerations. Others are geographic distribution of stores and of delivery area, multi-story, or single-story operation, and the degree of customer service to be offered. Proper materials handling begins long before the goods are received and is deeply affected by all the operating aspects of a store.

Integrated data processing, or even improved data processing, which speeds up the flow of documents and information through the system, can make major improvements in the efficiency of handling goods. Data processing can never be divorced from materials handling.[1] But so, too, materials handling cannot be divorced from Control requirements connected with accounts payable or inventory controls. Speed of handling also determines the size of the unjournalized stock and the ability of the store to take full advantage of discounts and anticipation.

Physical layout of the goods-handling area is basic to proper flow and equipment. Multi-store operations produce different considerations than one-store operation. The nature of the merchandise to be moved is essential in designing the appropriate system. Obviously perishable produce or baked goods must have different types of handling and equipment than will case goods.

Under certain conditions, more restricted approaches might be employed. From a detailed methods and procedures analysis of specific work steps, frequently short cuts can be found and production stepped up. A more useful attack is generally described under the title of Work Simplification in which the immediate task under study is not only broken down into components but also related to the flow of work before and after. Both of these techniques

[1] Data processing, as such, is discussed elsewhere in this issue and is therefore not treated here.

would involve Methods Engineering and its techniques of time study, work sampling, process charting, layout planning, study of personnel utilization and incentives, and preparation of equipment specifications.

Eliminating Unnecessary Services

Competition and low profit have caused reappraisals to be made of many functions of retail stores. Many services have been eliminated or are charged for rather than being freely provided. Charges for delivery of C.O.D. packages have become common in the past five years, for example.

Actually it should not be necessary to wait for dire economic necessity to force a reappraisal. A searching analysis, not only of the steps of a function, but of the function itself, will often lead to the conclusion that it is unnecessary. It may always have been unnecessary or may have become so but not recognized as such. Or it may be made unnecessary by exercise of management initiative.

In the field of eliminating the need for materials handling by stores themselves, some of the steps which have been taken are:

In Receiving

Drop shipment by vendor to customer, thereby by-passing store completely.
Drop shipment by vendor to customer delivery fleet, by-passing all prior handling.
Drop shipment of orders to individual stores of multi-unit organization.
Use of unit loads on pallets.
Use of disposable fiber-board pallets which need not be stored and returned.

In Checking and Marking

Use of standard size cartons and packs.
Proper descriptive information on cartons for ease in location.
Prepricing and preticketing.
Individual store packing of multi-store shipments to centralized warehousing area.

In Storage

Unit loads on pallets.
Cartons and units within, properly labeled as above, easily stacked or nested, noncrushable or protected from damage by proper packaging.
Minimum shipments geared to turnover which eliminate excessive stock.
Vendor controls including stock counts by vendor representatives.

In Distribution

Vendor drop ship to individual units as above.
Direct shipments to carrier which tickets merchandise and makes distribution to individual units (becoming common in ready-to-wear).
Prepacking by vendor.

In Delivery to Customer

Elimination of all or part by:

Vendor drop ship
Conversion to cash and carry
Minimum delivery amount
Charge for C.O.D.'s
Take-with campaigns in store
Design of boxes for easy carrying
Charge for "calls"
Open pack as with garments in bags, on hangers; television sets.

In Merchandising

Insistence on proper quality standards to avoid handling of refunds and complaints.
Self-selection fixtures carrying more stock on selling floor and by-passing reserves.

Elimination of unnecessary stock counts or descriptive data from checking such as size, color, or material.
Use of preprinted order and requisitioning forms, in sequence of storage and picking to eliminate extra labor.

These are not meant to be inclusive, merely indicative. The old advice not to work hard but to work smart is most appropriate in any examination of materials handling.

Some Illustrations

Assuming that goods must be handled, that good physical layout and general facilities are in existence, that a proper organization has been established, that training programs and morale are good, that the work flow steps have been analyzed and found essential, and that standards of performance have been set, we are ready to talk about the instruments to achieve these goals. These are very facile assumptions, and it is worth repeating that no major improvement in the handling operations of a store will take place without such prior research and preparation. Anything else is gadgetry.

The new warehouse of Diana Stores in New York City affords a good illustration of the systems approach. With the exception of dresses, all merchandise received at the platform is dispatched to upper stories of a four-story warehouse via a monorail or a highly ingenious "ferris wheel" conveyor. Switching at appropriate points for the proper number of cartons is done by electronic devices controlled by a console at the platform. Order filling is manual, but accumulation of orders for a store and distribution of store loads is also done via automatic equipment and control devices which are programmed either manually or automatically.

The operation of this retail warehouse is probably the most automatic of any in the soft goods industry. It is the latest installation of a series in which the Mangel stores and Alexander's were predecessors, and incorporates the experiences of these previous installations. Throughout the whole operation, electronic data processing equipment makes possible a smooth movement of goods in accordance with the needs of over 200 stores. The installation is reported to be able to handle an expansion to 400 stores. It also resulted in divisional realignments in management, an important reduction in time before receipt of merchandise in the retail outlet, substantial savings in direct labor, and permitted the company to operate efficiently in high rent quarters adjacent to executive offices. This installation is an important step in chain apparel warehousing.

In food distribution, the great warehouses of the major chains are more widely automated than in other types of retailing. Narrow margins in the food industry have compelled imaginative engineering further and faster there than in most other retail areas. Practically all central warehouses for food chains provide for bulk palletized storage via fork lift trucks, controls on stock levels and ordering by tabulating equipment, drag lines, and automatic switching devices, conveyors, and other adjuncts to moving merchandise.

Most of the mechanization, however, is applicable to standard grocery items

which come in cans or boxes and in standard packs. Handling of produce, fresh meats, dairy products, frozen foods, or the non-grocery items which are increasing in importance is still a major source of difficulty, still largely unmechanized, and not at all typical.

Order filling is still manual in food warehouses as in all other retail warehouses and is unlikely to change in the near future. This is true even in food warehouses which are concerned with filling store orders and not orders for individual customers as in a retail outlet providing customer delivery. So long as a typical large supermarket carries 5,000 to 6,000 items on its shelves and the normal rate of sale of any one item is rarely beyond a case or two per week—often less than a case—the filling operation will be difficult to mechanize economically. Experiments are under consideration now to meet this problem by electronic devices.

The Penn Fruit Company warehouse is an example of a high degree of automation but even more importantly it is an example of the "systems approach" to materials handling. *Fortune* Magazine (December 1956) describes the design as "organized around layout rather than automation." According to this report, the designer based his system on an analysis of sales, product by product and brand by brand. Fast sellers were put near the shipping docks; slow ones to the rear of the building. Thus types of goods might be split. For example, a popular brand of corn will be nearer the door than a brand that moves slowly. The result creates problems of location which are beyond human memory. All orders must then be converted to pick tickets which specify location and quantity and are arranged in proper sequence. The result is reported to be a remarkably cheap and efficient operation. It should be pointed out that it is not without mistakes, however. Mistakes in location and item identification can occur in many ways. Order pickers cannot exercise the ordinary judgment that they might otherwise use if they were not working with code numbers only. These mistakes, which are not infrequent, are important reminders that machines are not infallible.

A new distribution center was opened by Montgomery Ward in Detroit in August of 1958. The center will service 121 retail and catalogue stores in five states. Geared to a computer, an inventory control and order processing system will govern the movement of 6,700 types of goods through the warehouse. The warehouse, making use of the most modern devices and equipment, will permit 24 trucks and 10 freight cars to be unloaded at one time and 300,000 pounds of goods to be moved out in 50 trailers daily. This 600,000 square foot center, designed for furniture and appliances, is one of 12 planned by Ward's in a major revamping of its operations.

For Sears Roebuck, whose transportation costs for merchandise sold exceed $100 million per year and whose retail delivery costs are 22 million alone, handling procedures are a vital concern. Sears has long practiced pooled stock warehousing, thereby permitting stores to carry smaller total inventories and the warehouses to afford equipment which a single store could not. Walker D. Warner, materials handling manager of Sears,

stressed one concern of the company when he pointed out, in 1956, that a fork truck, which makes possible "the stacking of merchandise 21 feet high instead of 7 with manual labor, permits the building of a 100,000 square foot warehouse for about $700,000 as compared to a 300,000 square foot warehouse for $2 million."

Many department stores have revamped their materials-handling operation, but only a few have really made major modernizations in existing installations. When new warehouses have been constructed, these have incorporated the newer knowledge. Most stores are still committed to expensive and old urban plants for both store and warehouses. One of the most "engineered" of the newer installations is a new Emporium Capwell service building in Oakland, California. The building is a two-story structure of 230,000 square feet. Incoming trucks are received on the second floor via a ramp which leads to eight self-levelling sawtooth docks. Rail receipts are handled on the first floor, directly under the truck ramp, and taken to the second floor by a 10′-by-20′ hydraulically operated elevator.

Furniture and "bulk" delivery items are stored on the second floor, and all support activities such as a finishing workroom, spray booth, and cabinet shop are on this floor. Merchandise on this floor is shipped from this level at the other side of the receiving area.

Small items and soft goods flow down from the second floor by mechanical and gravity equipment. A dispatcher, on a raised platform on the lower floor, guides the carton to one of eight checking stations along belt conveyors. Provision has been incorporated for merchandise which cannot be processed immediately because of price differences or lack of an order, for removal of empty cartons, and for mechanical distribution of orders and other necessary papers.

Bloomingdale's was one of the first major stores in the New York area to convert its table checking and marking operation to a conveyor installation. Merchandise is carried in a conventional manner to an upper floor, stored, and then opened. Once opened, it is moved on conveyors to the appropriate stations for checking, marking, and record keeping. Paper flow was reorganized and brought closer to the actual operation in order to speed the process. Other stores also use this conveyor method for moving small wares and soft goods through these operations. Many stores are now using overhead monorails to move hanging goods either directly from the platform to the reserve or through the reserves after removal from trucks. Most stores seek to mark and hold fashion apparel in reserves adjacent to the selling floor and to avoid combining the marking and checking of such merchandise with centralized marking of other items. This is primarily to gain speed and to avoid soilage.

Equipment Considerations

Right at the receiving platform, we are involved with ramp levellors, portable unloading conveyors, monorail connections, trucks, skids, pallets, elevators, tractors, tote boxes and pneumatic tubes—in other words, most of the basic instruments of materials

handling come into action immediately.

When should we use skids and when trucks? What type and size of fork truck? Shall it be a drag line sunk in the floor or an overhead tote box conveyor? If a truck, what kind of tires or wheels? Skate or belt conveyors? Each of these decisions must be made with knowledge of the specific operating conditions such as working and turning room in the area, type of flooring, ceiling height. Space capacity and cost must be equated.

Storage itself entails the proper use of bins, shelving, and auxiliary devices in the reserve areas and similar determination of stock capacity on the selling floor. Again, the specific installation and policy must be meshed. Types of material, height of bins, and shelving will vary with items to be stored, with floor load capacity, and with aisle space required for transportation devices, such as fork trucks. The type of merchandise control used will also affect space utilization. Visually controlled merchandise generally demands that space be allocated for the item on a relatively unchanging basis.

In the delivery area, control over routes, stops per truck-mile, night loading, control over both documents and funds, sorting methods for packages, conveyors and chutes which carry merchandise through sorting to delivery are only a few of the factors involving study. The most highly organized materials handling systems for delivery to a retail customer have probably been developed by the United Parcel Service. Parcel Post, freight, and express delivery require different methods. In these areas, several of the large mail order houses are most experienced and have evolved mechanics for rapid document processing along with merchandise movement. One large mail order warehouse, for example, is prepared to handle orders for smallwares on a regularly scheduled time table from receipt of bags of mail to arrival of order at delivery platform of warehouse. Twenty minutes from receipt of order in the stock room to delivery is the rule.

Specialized equipment has been designed for better handling of specific items such as TV sets, china and glass, carpeting, or for specific conditions such as alteration workrooms, cleaning and laundry, restaurants, etc. Each is dependent on techniques derived from very special problems and can only be pointed out. So too in the area of supplies. Storage and movement of all forms and documents, of boxes—regular and gift—bags, cleaning and maintenance supplies pose important problems to those concerned.

Summary

There is an enormous variety of equipment and a wide literature on the twin subjects of automation and mechanization. Anyone who is faced with an immediate problem of choosing equipment should investigate the literature as well as talk with the many manufacturers. And in selecting equipment, it is important to take maintenance factors into consideration. Equipment which breaks down frequently can often cost more in money and time than it was expected to save, but this waste may not even be known. Unless adequate and specific control records

on equipment maintenance time and expense are kept, there may appear to have been a gain made by introduction of equipment but a real loss from an unplugged and unnoticed drain.

A total concept which relates all the materials-handling organization to the store's organization is the first step in evaluation of efficiency in this area. Before goods can be moved, certain policy decisions must be made. These would include such questions as: How much can we afford to spend for handling? What are our inventory turnover goals? What delivery time shall be offered to a customer? Shall there be centralized branch store receiving? Where shall our warehouses be located? A plan related to total function is essential: The system for materials handling must be charted first and there must be flexibility. Specific decisions on equipment can be made at later and appropriate times.

One must deal in broad terms and at management levels in order to make automation effective and economical. This is not to argue that there is not opportunity in specific areas for automatic control devices or techniques. It is simply to point out that the real benefits of automation are generally found in the broader areas of operation and decision-making. Automation is likely to improve the multiple interests of many divisions whereas mechanization may lie wholly within the jurisdiction of materials-handling.

Before proceeding with any proposed change, management should demand of its own aides a thorough evaluation of the proposal in which alternatives are discussed, costs detailed, and predicted gains made specific. Such a program, if critically evaluated, will almost invariably avoid the disappointment of large hopes on shaky foundations. If the problem is of such scope as to be beyond the talents available within the organization, management should consider the use of outside professional advice. If the costs, both tangible and intangible, are relatively great, it is often well to have an outside independent appraisal, even if the talent is available within the organization. Confirmation of judgment, with the introduction of thinking by people not concerned with internal politics, can be highly valuable. The advice of outside experts must be weighed carefully along with the recommendations of executives most directly concerned with the problem. Only then can a sound decision be made.

Some of the benefits which can be obtained through improved materials handling are substantial reductions in expenses for direct labor, sharp reduction in inventory requirements, greater speed in delivery to the customer with a consequent increase in sales and reduction in cancellations and refunds because of delayed delivery. Economical use of space can reduce investment in storage area required, or it can free space for other productive uses.

Materials handling, which is part of a program of automation, can permit greater diversity of lines to be carried through extending the capacities of human minds to control. Management can be freed to concentrate on tasks of growth, expansion, and improving profitability. Better goods handling can give a company an important competitive lead, and is worth every bit of attention which can be paid to it.

How Machines Improve Merchandising

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How automation can help merchants to plan advance stocks, reorder faster, minimize markdowns, and in many other ways improve their specialized function in distribution.

A successful merchandiser, like a successful military commander, knows how to "get there fustest with the mostest." By this we mean that one of the problems in carrying out the merchandise function successfully is to bring the wanted assortments and selections of goods to the point-of-sale more quickly than does the competition.

This puts a premium on speed—speed in getting information and speed in making decisions. It also presupposes thoroughness because unless the speedy decisions are also correct decisions, they are not only valueless but costly.

It is against this additional requirement for successful retailing that we must judge and estimate the impact that automation will have on the efficacy of the merchandising function. And this includes all phases of automation—those that have to do with the development, processing, and analysis of information as well as those which have to do with the physical handling of goods or the performance of traditional retail services.

But automation will impinge most directly on the merchandising function in the area of supplying information. This means the development of data on sales and stock and the relationship of sales to stock in a variety of breakdowns and in varying time periods according to the desires and needs of the merchandising executives.

How Can Automation Contribute?

Under present operating conditions, most merchandising executives already have adequate tools for the job of getting the right merchandise at the right time, at the right price, in the right quantities. They can have information as detailed as they wish, provided they are willing to spend the time and money to get it. Where, then, can automation make its contribution to merchandising? It can do so in two ways. One is to get the information faster, and the other is to get it at less expense. In a practical way, then, the factor of reduced expense can be translated into more detailed information since it is not only the time factor but the cost factor as well which now prevents the merchant from obtaining all the information which might be available under existing operating techniques.

What does the merchandising executive do, and how would more information more speedily obtained help him to do it? Basically, the merchandising function has two objectives: (1) the planning of buying and selling activities and (2) the co-ordination of merchandise offerings with the over-all store image. Automation, by providing more detailed and more accurate information at greater speed, will help in carrying out the first part of this merchandising function; i.e., the planning of buying and selling activities. It will have little bearing on the second part and no influence on those managerial functions which fall within the lot of merchandising executives in most retail organizations.

So let us see how automation can influence the various components of that part of the merchandising executive's job which has to do with the planning of buying and selling activities.

Meeting Fashion Demands

Reordering is one of the most important elements in the merchandising job, particularly in lines heavily influenced by fashion. And the role of fashion is growing, influenced by the media of mass communication such as radio, television, magazines, motion pictures, as well as by the greater leisure and gregariousness which are part of modern community life.

The widespread interest in Paris originals is one indication of how strong a hold fashion has taken on American life. In merchandising, this has stimulated the preoccupation with Paris designs of such diverse mass merchandising organizations as Sears, Roebuck and Company, Montgomery Ward, Ohrbach's, Alexander's, and even the houses which make patterns for home sewers. And interest in fashion should continue to grow as larger proportions of the population extend their education into high school and college and become increasingly aware of good taste and good design.

On a practical retail operating level we can interpret fashion as the style in current demand. So as fashion interest grows, it becomes increasingly important to interpret current demand quickly, and reorders are the result of such interpretation. But as every merchant knows, the reorders on which speedy action is most important are often the orders on which delivery is slowest. The reason is obvious: as

reorders roll in from all over the country, concentrating on a narrow segment of the wholesale offerings, manufacturing facilities become overwhelmed and are unable to keep up with the demand. This puts a premium on the need to recognize the reorder items quickly, more quickly than the competition, because the store which reorders first can often beat the delivery jam-up at the manufacturing level and, of course, get most of the early business.

The devices and equipment which we associate with modern developments in automation can quickly give the merchandising executive the knowledge he needs in terms of sales and stock by department, classification, vendor, style, and price. In addition, it holds forth the promise of supplementing this information with size and color breakdowns. And there are further possibilities, such as breakdowns of sales and stock by style and size. In fact, the way would be open to many analyses which are impractical under existing methods of developing information. For example, the merchant may want to know markdowns by vendor or customer returns by vendor, or markdowns by size. He could obtain analyses of customer complaints in a variety of ways and in general dissect his operation in accordance with what he considers to be his needs.

Such information would provide a sure means of arriving at answers which now often require the use of rule-of-thumb methods. And the rule-of-thumb methods may be misleading. Thus a merchant may decide that a current color favorite is probably not selling in the big sizes. Yet an actual analysis may show that it is. In the same way, a merchant who decides that a certain type of skirt is only for a juvenile figure, based on his past experience, may be a wiser but a sadder man by the time the season ends. Sales and stock analyses by style and size early in the season might have saved him the experience of learning this lesson the hard way.

Most stores find it necessary to do some testing. A major problem in conducting such tests is that they must necessarily involve small quantities of merchandise. Therefore, by the time the test information is available, it may be too late to exploit it fully. To illustrate, if a store sells three dozen of an item a day, that information has one meaning. But if the record shows that three dozen of the item have been sold, and the report covers a week's business, the problem of how much to reorder becomes more difficult to resolve.

What we see here is the importance of knowing not only sales but rate of sales, in order to evaluate information properly.

Relation of Sales to Inventory

Similarly, it is also important to relate sales to inventory. For example, two styles may each have sold six pieces in a week. But the one sold six out of twelve and the other sold six out of 24. When matched against the inventory information, the sales data become vastly more meaningful. The need to evaluate sales in terms of inventory, whether it be sales by style, classification, color, size, or any other desired breakdown, is too obvious to be labored.

Naturally merchants can obtain the sales and stock information they want by manual methods, but the question of costs places limits on how far firms are willing to go to assemble and analyze information. In addition, there are the questions of speed and accuracy. Manual methods can develop the required information, but can they do it quickly enough to enable the merchandising executive to derive the full benefits of the results? And can he accept the data thus presented without overriding reservations, since work of this kind is so subject to human error?

So the merchandising executive can look to automation as a means of getting faster, more detailed, and more accurate sales and stock reports. One of the uses to which he can put this information is to improve the speed and effectiveness with which he carries out the reordering phase of his operation.

Minimizing Markdowns

But the merchandising function must not only produce sales, it must also maintain an adequate gross margin. To do this successfully, the merchant, among other things, must minimize markdowns.

The speed with which he obtains sales data, of course, will contribute to the success with which he carries out this portion of his over-all function. Where markdowns are necessary, it is axiomatic that the sooner they are taken the smaller they are likely to be. Obviously the merchant who has the tools to spot his reorder numbers quickly also finds his laggards in the same reports. So in assessing the benefits which merchandising executives will derive from automation, we must include the possibilities of keeping the markdown figure under closer control.

Balanced Assortments

A store must not only have the right merchandise, at the right time, at the right price, and in the right quantities, but it must also have balanced assortments. Failure to achieve scientific balance both loses sales and increases markdowns. Most often deficiencies in balance start with the original inventory, or they may result from inadequate filling-in which stems from insufficient or inaccurate sales and stock information.

A manufacturer may offer assortments in size and color which are valid from a national viewpoint or which fit best into his production planning. But the assortment of sizes and colors available in the market may not be one which is best suited to the needs of the individual store.

As a first step in obtaining an assortment which is best for his operation, a merchant must first know his needs. This involves analyses. Such analyses are feasible by manual methods, but they take time—so much time that a merchant may be forced to operate with broken stocks for considerable periods. And when broken stocks occur toward the end of a season, it often becomes impractical to fill in.

Thus the merchant who can get his size and color information quickly can expect to derive two important benefits. First, he can plan a better balanced stock in advance of the season; second,

he can keep the stock in better balance as the season progresses.

Part of the merchandising function involves forecasting future sales. Here it is not only important to know what the customers currently want, but what they will want in the future. The ability to anticipate trends in style, color, fabric, or design gives the buyer a tremendous advantage. Knowledge of such trends enables him to select intelligently from the tremendous array of merchandise put before him in the market.

Once a buyer has isolated the factors which make an item sell, he can recognize in new offerings the trends which have previously proven themselves. Thus, if red has gone from five per cent to ten per cent of sales in the previous season, he may feel justified in buying 15 to 20 per cent red for the new season. Even when looking at an item which has no apparent previous history, there may be proven elements such as a neckline or a fabric which indicate its probable success.

Increased Need for Automation with Branches and Chains

As retailing develops a more complicated structure through the addition of branches and the continuing growth of chain operations, the merchandising executive necessarily has less contact with the selling floor. It therefore becomes necessary for him to rely more and more on outside reports to carry out his buying and selling functions effectively.

Branches also have difficult problems resulting from the need to maintain assortments and selections representative of the organization in a much smaller space than is available in the parent store. Add this space problem to the handicaps imposed by the physical separation of the merchandiser from his branch stock, and the need for quicker and more detailed sales and stock reports by a means which the organization can afford, costwise, becomes even more pressing.

Branches also tend to increase merchandise handling problems within the organization. For perishable goods, this means more exposure to soilage, damage, and other non-merchandising causes for markdowns. It also lengthens the processing time within the organization, thus increasing the amount of merchandise in the pipeline between the receiving platform and the selling floor. This loss of selling time on seasonal goods must reflect adversely on sales volume, stock turnover, and markdowns.

Delays in handling merchandise or documents during the order-filling and delivery process also reflect on the effectiveness of the merchandising executive's performance. And needless to say, the physical condition of the goods at the time of arrival in the customer's home has a great bearing on whether or not a piece of merchandise stays sold.

So the merchandising executive has a stake in the automation of the selling and sales supporting services within the retail organization as well as with the statistical and information-developing processes upon which he depends directly in the performance of his duties. And while under the prevailing separation of duties in retail organizations, the merchant may not be re-

sponsible for the performance of such handling and processing functions, his own performance is nevertheless directly tied in with their effectiveness and efficiency.

Attitudes Toward Automation

Given these many points of influence on the merchandising function by automation, whether in data processing or merchandise handling, why has there not been more support among merchandising executives for new developments in this field?

As far as servicing and merchandise handling is concerned, the answer may well be that the merchants feel themselves only indirectly involved. They therefore tend to leave the problems in these fields to the operating and management executives.

But in activities which involve the preparation of merchandising reports and analyses, we are dealing not only with areas which affect the merchant but which touch directly upon his operating responsibility. Is there a fear that such mechanical means will replace merchandising skills? Is there concern that more detailed reports and analyses will open the way to more detailed and wider-ranging criticism of the merchant's performance?

Perhaps here we are dealing with a need for more education. Merchants must come to realize that automation will not replace merchandising skills but only make them more effective. Managements must come to understand that unbridled criticism can defeat its own objectives and deteriorate rather than improve the performance of individuals. Past performance may also play a part in the attitude of merchandising executives toward reports. Inaccuracies in past reports have a way of lingering in the memory and inhibiting the willingness of merchants to rely upon the accuracy of the information they receive. Where information is slow to arrive, its usefulness is also diminished. So it is reasonable to believe that merchandising executives would place more value on information if they got it faster and if they could have confidence in its accuracy. Automation would provide this speed and, since it would diminish the aspect of human error, it would also add accuracy to the information produced.

Basically, stores measure the success or failure of the merchandising function by its performance in producing sales, maintaining gross margin, and speeding the turnover of inventory dollars. If the fruits of automation would enable merchandising executives to improve their performance as measured by these yardsticks, the store would gain immeasurably in its competitive strength.

This raises a question as to whether or not retailers will, in the end, have any real choice in deciding whether or not to invest in automation. For if automation does what it promises to do, those retailers who adopt it and master it will so outperform their competitors who do not as either to threaten their existence or to relegate them permanently to a marginal existence as second-raters.

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Current Equipment for Textile Testing

WILLIAM H. MASTERSON

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What machines are available to test specific qualities in fabrics? Why are these increasingly necessary today? How well are specific machines performing their function? These and other questions are explored by a leading textile engineer.

The merchant who handles textiles today must expand his knowledge rapidly to keep up with several fast pacesetters: the manufacturers who are constantly developing new fabrics or new combinations of fabrics; the stylists who are constantly whetting the consumer appetite for new products; and the consumers themselves who are steadily increasing their own knowledge of products.

When purchasing textiles for personal wear or household use, the average consumer of today considers style, color, and fashion as well as immediate use value and durability. She has accumulated considerable knowledge as the basis for making her value judgments.

Testing bureaus are one method of keeping pace with rapidly increasing products and with rapidly increasing knowledge of them by the consumer. Without such bureaus and their tests, the merchant would be hard put to accumulate the data necessary to answer consumer questions honestly and accurately about his wares. For in dealing with textiles, the *desire* to be honest and helpful is not enough. One must also be well informed—a goal which is not easy to achieve.

In these bureaus many tests are conducted by chemical means, such as the breakdown of the fiber content of a material or fabric. This type of testing does not necessitate the use of any specific apparatus. For other types of testing, such as color fastness, abrasion resistance, or flexing resistance, it is necessary to simulate conditions which the product will encounter in its end use. For these, many precision-type instruments and other kinds of

testing machines have been developed. Only these tests and the equipment for making them will be considered here.

Standard Machines and Apparatus

A partial list of some of the standard machines and apparatus in common use in textile laboratories, together with their functions and purpose, follows:

COLOR FASTNESS TO LAUNDERING: LAUNDER-OMETER. Standard apparatus used to determine color fastness of dyed textiles. Controlled water temperature enables determination of color fastness properties at any given temperature. Apparatus has rotating action. Color fastness to dry cleaning can also be determined with this apparatus.

COLOR FASTNESS TO SUNLIGHT: FADE-OMETER. Standard apparatus used to determine sunfastness properties of dyed textiles. Controlled atmospheric temperature and humidity during testing. Samples to be tested revolve around a carbon-arc light which produces ultra-violet rays.

COLOR FASTNESS TO CROCKING: CROCKMETER. Apparatus produces rubbing action on dyed textiles to determine degree of color mark-off.

TENSILE STRENGTH OF FABRICS. Various types of machines are used to determine pulling strength of fabrics and yarns. Direct pull on fabric is produced by machine action which records exact strength on dial.

ABRASION RESISTANCE: STOLL FLEX, STOLL FLAT, TABER, WYZENBEEK, ETC. Various machines produce flexing, circular, or straight rubbing action on fabrics to ascertain abrasion or wearability. Number of rubs, strokes, or cycles is automatically recorded on counter during test.

PILLING RESISTANCE: Special apparatus used to determine pilling resistance (small round balls of fiber on surface of materials which result from abrasive wear action). Machine incorporates a gentle circular action on the fabric. A stiff bristle brush is used as the rubbing medium followed by similar action with a cellulose sponge.

ACCELEROTOR (SPECIAL TYPE APPARATUS). Various type tests such as edge wear, shedding of fiber, and other special tests can be conducted on this apparatus. Controlled speed can be obtained by rheostat. Inner chamber has small propeller which can be operated at variable speeds.

FLEXING RESISTANCE. Special apparatus is used for determining flex resistance, especially in shoe fabrics. Apparatus gives up-and-down action, folding the material on itself to simulate folding or flexing action of a shoe fabric while being worn.

FLAMMABILITY. This is the standard apparatus to determine flammability in accordance with Flammable Fabrics Act (Federal Law). The apparatus automatically records, in tenths of a second, the time that it takes to burn a given area of fabric. Automatic stop gives accurate timing. Note: Other types of testing apparatus are also used for various types of flammability in accordance with end usage.

CREASE RESISTANCE. Several types of equipment are available to test crease resistance. One type commonly used is based on angle of recovery which records the angle at which the fabric recovers after creasing or folding.

AIR PERMEABILITY OR POROSITY. There is standard apparatus for measuring the air flow through a given material. Results obtained can be calculated to give air flow in cubic feet per minute per square foot of fabric.

RESILIENCY. Instrument measures resiliency of materials, such as velvets, carpets, and other pile materials. Instrument measures original thickness and then creates pressure of any given number of pounds per square inch, which is released after a period of time. Results obtained can be calculated as recovery. Direct readings from pressure gauges are obtained from this instrument at each stage of operation.

WARMTH OR HEAT RETENTION OF MATERIALS. Various types of testers for this purpose are available. One type is based on the amount of electrical energy it takes to keep a cylinder at 98.6 degrees with and without insulation, using the test fabric as the insulator.

RAIN TESTER. Standard apparatus used to measure the amount of water that will pass through a material at specific water column heights. Water is sprayed on fabric in a horizontal line at different water height pressures. Water which passes through the material is collected on blotting paper. Weight of wet blotter—less original weight of dry blotter—gives actual weight of water that passed through material.

WASH AND WEAR. Household automatic washing machines are used as a basis for evaluating wash and wear claims.

The apparatus listed above represents but a few of the various methods used in textile testing. The listing, however, does show that the use of testing machines and apparatus is a very important factor in the field of textile testing. Many special types of equipment are built for a specific test, and in the past few years many large organizations have realized the importance of special types of testing equipment to predetermine the performance of some new item or product. This special equipment is too varied and numerous to cover in this article.

Textile tests, however, regardless of how they are conducted, are meaningless unless standards or specifications are available so as to evaluate the test result. To this end, many organizations, department stores, retail outlets, associations, and governmental agencies (city, state, and federal) have standards, specifications, or laws covering textile items and products which serve as a guide to the technicians in evaluating the test results.

The war years were responsible to a great degree for making manufacturers especially conscious of the value of textile tests, due to the rigid specifications that had to be met on all items purchased by the government. The competitive markets of the wholesale and retail fields of merchandising are also conscious of the need of textile testing due to the many exaggerated claims that are made for one product over another.

Reasons for Automation in Textile Testing

The value of textile testing cannot be underestimated as it provides the backbone for evaluating a textile product or

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Future of Automation in Retailing

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A challenging examination of the critical point where flow of goods meets flow of customers. Some predictions and some probing questions about the desirability of a fully push-button world.

The word *Automation* conjures up visions of a "man of the future" sitting at an electronic console switchboard and operating a complete business enterprise by activating a series of switches, levers, and buttons. In these visions, great masses of raw material are poured into one end of an immense machine-like building, and out the other end comes a stream of finished gadgets, all packaged and ready to be sent off to the waiting market.

Such visions are not entirely fantastic. For some processes, the push-button factory is already a reality. Further development is entirely within the capabilities of the present state of technological development. The manufacturer is able to make extensive use of automation because the productive process involves mostly problems of materials handling and assembling. While there may be sub-assemblies and subsidiary processes, the manufacturing is essentially a single-flow operation. All materials and all processes are aimed at the one goal of bringing forth a stream of identical finished products.

Retailers periodically find themselves subjected to criticism because they have not kept pace with producers in adapting automation to their operations. It may be that some measure of this criticism is justified, but it is unfair to expect retailers to achieve advances in the use of automation as rapidly as producers are achieving them. The critic who expects them to do so has a very superficial knowledge of the retail process.

In recent years writers and speakers have tended to describe the retail process as the management of a flow of goods from supplier to customer. This concept is somewhat dramatic, but it is frequently useful as a tool for analyzing retail operations. It repre-

sents, however, a great oversimplification of the processes involved in, and the functions performed by, modern retailing.

Why the Lag in Retailing

Instead of being concerned with a single-flow operation, such as is found in production, the retailer is confronted with the management of two separate flows or streams. First, there is the flow of merchandise which must be controlled by the retailer from the time it comes into his possession until it is delivered to the customer. In addition, however, there is the stream of customers who must also be influenced in such a way that they will come into contact with the flow of goods at the point of sale.

The two-flow concept could be presented graphically by adapting the conventional demand and supply curves which are used in economic analysis. The flow of goods could be represented by the upsweeping supply curve while the flow of customers could be shown as the downsweeping demand curve. Where the two lines or streams cross is the critical point in retailing which we call the point-of-sale. The tremendous importance attributed to the salesperson or the sales device is due to the fact that these are the only agents which work at the point-of-sale where the flows of merchandise and customers come together. All other functions in the retailing process are carried on solely to support the vital activities that take place at this point.

Ideally, the retailer would like to be able to arrange a fully controlled flow of merchandise which would move without interruption from the supplier to the point-of-sale, where it would be met by a corresponding flow of customers who would exchange money for merchandise. Beyond the exchange point, the retailer would have the money and the customer would have the goods.

Where Control Is Not Possible

Actually, in our modern economy, the retailer does exercise almost complete control over the flow of goods as far as the point-of-sale. He can, and does, make use of numerous automatic devices in controlling that flow. He cannot, however, exercise any such degree of control over the flow of customers. Customers are human beings and, happily, are not yet ready to be controlled by any kind of automatic device.

As a result of the dual flow situation, the retailer finds that he is unable to direct the stream of goods in continuous flow beyond the point-of-sale. The flow is inevitably interrupted at this point, and stays stopped until a customer appears who says, "I'll take one of these." To further complicate the situation, these pauses in the flow process are not all of even length for any given item of merchandise, and the length varies tremendously among different items.

When the flow resumes, it may proceed in any of several different directions. The customer may carry the merchandise away; it may be delivered to his home by messenger or agent; or it may be placed in storage until the customer completes his part in the transfer of ownership.

Flow of Goods

It is significant that most of the progress in the use of automation in retailing has been made in the areas which deal with the flow of goods. Little progress has been made in the control of the flow of customers. We are able to find examples of improved materials-handling devices, marking machines, automatic or semiautomatic warehouses, automatic reordering devices, and new machines for recording rate-of-sale and inventory statistics. All of these exert their influence on the flow of goods before it reaches the point-of-sale. We also find improved machines for recording and counting cash transactions, improved packing and shipping devices, and many excellent advances in methods of handling credit payments. These latter devices work on the flow of merchandise after the point-of-sale has been passed.

However, despite the many fine mechanical devices that have been developed for the use of the retailer, too little progress has been made in co-ordinating their use. For the most part, the devices work independently to perform functional or staff operations which aid the flow of goods. True automation in retailing would be closer to realization if these separate activities could be co-ordinated into one automatic operation which would deliver a perfectly balanced stream of goods to the point-of-sale.

Inherent Limitations

Nevertheless, it seems unlikely that this amount of co-ordination will take place in the near future. One obstacle is that the control of a flow of merchandise involves an almost infinite number of human decisions. For example, it is much easier to construct a machine which will calculate *how much* to buy than it would be to construct one which would decide *which items* to buy. Up to now, automation in the sphere of merchandising has been confined almost entirely to the use of staff or supporting services which aid a buyer in making merchandising decisions or which free him from routine duties so that he can devote the major portion of his time to making buying decisions. It is to be hoped that steady progress can be made in the co-ordination of automation in merchandise flow control. However, it is unrealistic to expect the degree of progress in this direction which has occurred in manufacturing because of the more numerous human decisions which are involved in the retailing process.

Even if a much greater degree of automation is achieved in the merchandise flow area, automation in retailing will not have become an accomplished fact. There will still be the problem of the apparently unavoidable interruption of the flow at the point-of-sale. And even more significant is the fact that there will still be the problem of finding some way of applying automation to the flow of customers. It is true that such selling services as delivery and credit exist in part because of their stimulating effect upon customer demand, and therefore whatever developments in automation take place in these areas may be said to act indirectly upon the demand side of the equation. True, the use of machines

in merchandise management may help to interpret customer demand, but even so, there is no indication that the devices themselves act directly upon the flow of customers. Although they may simplify the actual work of stimulating demand, there is no indication that demand is stimulated more actively or positively than it would be without their help.

Stimulation of Demand

In an economy of plenty, however, the supply side of the economic equation becomes less important than the demand side. When customers are free to choose among many varieties of similar products and among many stores which sell similar products, they have achieved a powerful and dominant position. When this point is reached, the stimulation of demand becomes an essential retail activity. In fact, we can safely say that demand stimulation, or sales promotion as we choose to call it, has become the most important part of the retail process in our modern economy. A continually increasing percentage of the retailer's time and effort goes into some form of demand stimulation. It seems logical to assume that this trend will continue in the future.

Therefore, if automation is to become more widely used in retailing, it must make inroads into the field of demand stimulation. To say that this is not so and that the nature of sales promotion does not lend itself to mechanization or automation is to assume that a state of perfection has been reached in the development of demand stimulation devices. Such an assumption is unthinkable in this modern world.

There are many areas which present great possibilities for the future development of automation. Foremost among these is the field of advertising. It would not be fair to say that no progress has been made in this area, because there have been many important improvements in the techniques of advertising production. Mass production of signs and mats is an established practice among chain retailers. But we have injected little in the way of automatic devices into our uses of the available methods of communications. Demand stimulation at the retail level is waiting for the efforts of people with real vision. We can expect to see fantastic changes in the use of automation in advertising in the next few years.

Automation at the point-of-sale is presently thought to mean the use of the vending machine. This device defeats many of the aims of automation in that it requires much personal attention to keep it in operation. Improvements are sure to be made in vending machines, but they are likely to appear as changes in the demand-stimulation aspects of the machines. A mechanically perfect *distributing* machine is not necessarily a good *selling* machine. Conventional retailers who wish to compete with vending machines will find their best opportunities in the vital area of sales promotion.

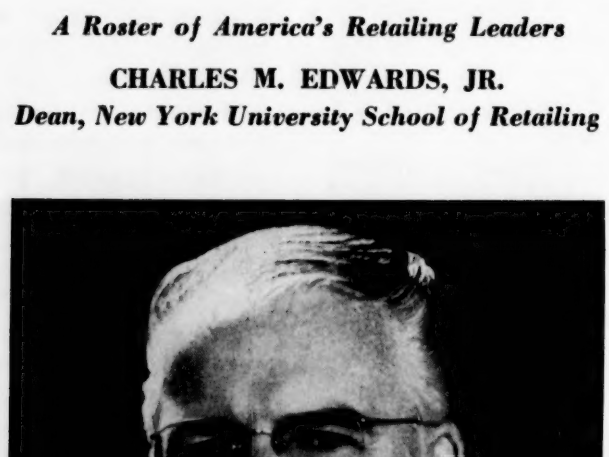
Progress will certainly be made in the direction of taking much of the labor out of the task of building mass displays of goods. As retail stores continue their trend toward larger units,

(*Continued on page 63*)

The Honor Roll in Retailing

A Roster of America's Retailing Leaders

CHARLES M. EDWARDS, JR.
Dean, New York University School of Retailing



George A. Scott

For more than thirty years the New York University School of Retailing has been honoring leaders in retailing from all parts of the country by conferring upon them honorary membership in the Alpha Chapter of the Eta Mu Pi Fraternity, the only fraternity of its kind in the field of retailing. Founded in 1922 in the New York University School of Retailing, Eta Mu Pi has grown into a national organization.

In keeping with the high standards to which it has adhered since its establishment, the Alpha Chapter grants honorary membership only to those who have made noteworthy contributions to the ethics, the science, and the practice of retailing.

When it awards honorary memberships to men and women of outstanding accomplishment in retailing, the Alpha Chapter presents to the recipients written citations that summarize some of

the major facts about their achievements. In the belief that the careers of these distinguished merchants will prove interesting and inspiring to its readers, the JOURNAL OF RETAILING *publishes one or more of these citations in each issue. The purpose is twofold: (1) to call well-deserved, wider attention to the attainments of some of the foremost business leaders of our day, and (2) to provide a cumulative source of information about retailers for reference purposes.*

Chosen for recognition in this issue is:

George A. Scott

George A. Scott is an inspiration to all who have been identified with the New York University School of Retailing, which is proud to claim him as a member of its class of 1930.

When George was a child, his family with ten children came from Scotland to Canada and then, when he was sixteen, to Los Angeles. Immediately thereafter he went to work as a stockboy in Walker's Department Store. The store owners, Mr. and Mrs. Ralf Marc Walker, were not only impressed with their young employee, they were sufficiently enthusiastic to adopt him as their foster son. This storybook event tells us volumes about young George.

With professional study and diligent application, George earned successive promotions until he was appointed vice president and general manager in 1935 when the store moved to San Diego. In 1951, succeeding both Mr. and Mrs. Walker, George Scott was named president, and the store became the Walker Scott Company. The first year in its new location, the store's annual volume was $850,000. Last year the sales reached nearly $10,000,000. Despite its large size, the store retains the friendly personal atmosphere that is characteristic of George Scott. Of his 450 employees, 100 are stockholders in the firm. Even more unusual is the number of employee clubs, some for welfare, some for social, others for systematic charitable purposes. Obviously George Scott continues to stay as close to people as he does to products.

In fact, the helping hand given the boy George has been nourished by the man into myriad helping hands. His humanitarian activities extend to twenty-four civic and charitable organizations, as trustee, as director, or as a board member. It is not surprising that in 1953 he was named "Mr. San Diego." But his influence reaches beyond local clubs to national groups, and from business associations to universities.

At New York University, George Scott set a precedent by establishing the first scholarship for a year of graduate study in the School of Retailing. This lifelong emphasis on generosity will undoubtedly carry on to future generations through the Scott children, Walker and Andrea.

For his tradition of service, California Western University conferred on George Scott an honorary doctorate in 1952. New York University School of Retailing proudly accorded to this distinguished alumnus honorary membership in the Eta Mu Pi Fraternity for all his do-it-yourself achievements.

Book Notes*

Appraising Executive Performance, by Carl Heyel. New York: American Management Association, 1958, 189 pages. $4.50.

This handbook describes the principles and techniques used in executive appraisals. It explains how to set up yardsticks for measuring an executive's performance, his qualifications, and his weaknesses; how to determine the "right time" to evaluate performance; how to judge specific managerial skills; how to relate the executive's personal traits to his work; and how to explore his attitudes, motives, and understanding of the job.

Carl Heyel has been director of planning, Mergenthaler Linotype Company, and associate partner, George H. Elliot Company, Management Consultants.

Chain Stores in America, 1859-1959 (Centennial Edition), by Godfrey M. Lebhar. New York: Chain Store Publishing Company, 1959, xii plus 401 pages. $6.95.

The Centennial Edition of *Chain Stores in America, 1859-1959,* marks the 100th anniversary of the founding of the Great Atlantic and Pacific Tea Company, the oldest and the biggest chain store. It brings up to date the material presented in the first edition which covered chain store development from 1859 to 1950. Among the new features in the latest edition are: (1) an updating of all material throughout the volume, (2) an analysis of the 1954 Retail Census, (3) latest developments in status of Fair Trade Acts, and (4) an appendix showing growth of 41 major chains, by stores and sales, from their early beginnings to date. The new volume constitutes an indispensable reference work for anyone—retailer or layman—who seeks information about chain stores and their development.

Godfrey M. Lebhar—lawyer, journalist, editor, publisher, and author—founded *Chain Store Age* and was a prime mover in organizing the National Chain Store Association in 1928. He is recognized as a leading authority on the chain store system of distribution.

Directory of Department Stores, 1959 edition. New York: Department Store Guide, Inc., 1959. $40.00.

This new edition of the directory again enables retailers to have at their finger tips all needed information for contacting executives and merchandise personnel. 3,198 companies are indexed, as well as 41,546 buyers, merchandise managers, and top executives. Each company listing shows headquarters address, buying office, and exact number of stores operated, as well as the locations of branches under the main store listing. Of particular interest is the special "pink-page" section which lists the major resident buying office as well as the New York office of department store groups, with a list of their buyers and buying functions, and a complete listing of the department stores each office represents. In this section are found such resident offices as AMC, Frederick Atkins, Gimbel's Central Buying, Macy's Corporate Buying, The May Co., Mutual Buying, etc.

To merchants, this publication is one of the indispensable office tools, as frequently used as the dictionary, the general telephone book, and the adding machine.

* Unless otherwise noted, Book Notes were prepared by Dr. Theodore D. Ellsworth.

Making Management Human, by Alfred J. Marrow. New York: McGraw-Hill Book Company, 1957, xi plus 241 pages. $5.00.

This volume emphasizes the ever-increasing role of psychology in management. It suggests how to create in one's self and in managerial staffs a sensitivity and awareness of social problems, focusing on the human factors with which one must deal to achieve success as an administrator. It outlines ways to create a favorable work climate and to build group morale, teamwork, and loyalty. Sprinkled liberally throughout the text, case studies are used to illustrate such points as: (1) the effect of participation on morale and productivity, (2) the power of a cohesive group in forcing a policy change, (3) the effect of group pressure on the nonconformist, (4) the reasons why wage incentives often fail, (5) factors in making a profit-sharing plan successful, (6) the effect of group decisions on output, and (7) overcoming resistance to change.

Alfred J. Marrow is president, Harwood Manufacturing Corporation, and is a member of the Psychology Faculty of the New School for Social Research. He is also chairman of the City of New York Commission on Intergroup Relations.

Management and Organization, by Louis A. Allen. New York: McGraw-Hill Book Company, 1958, xi plus 353 pages. $7.00.

The stated purposes of this volume are to help managers: (1) make organizational changes necessary to expand profits, (2) analyze their organizations to foster sounder growth, and (3) advance their personal careers in professional management. It provides an analysis of the current trend toward divisionalization and decentralization, and suggests ways to carry out these objectives. In the process, it reveals company names and describes their techniques for handling problems such as centralization and decentralization, design of organization structure, staff and line relationships, reorganization and delegation.

Louis A. Allen is president of his own management consulting firm.

Production Planning and Inventory Control, by John F. Magee. New York: McGraw-Hill Book Company, 1958, xi plus 333 pages. $7.50.

This volume provides an explanation of the latest ideas and techniques of monetary control and production planning in terms of operation research thinking. It shows how the basic function of inventories and the different policies and costs which affect inventory and production planning decisions relate to one another and how they are balanced to arrive at a sound inventory policy. Included in the material are discussions of subjects such as: (1) the use of servo theory concepts to control production fluctuations, (2) linear programming in seasonal planning, (3) new scheduling devices, (4) methods for very short-run forecasting, and (5) a basic stock concept for controlling production and distribution through several stages.

John F. Magee is a member of the Operations Research Group, Arthur D. Little, Inc.

Readings in Management, by Max D. Richards and William A. Nielander. Cincinnati, Ohio: South-Western Publishing Company, 1958, x plus 882 pages. $7.50.

This volume contains 91 articles dealing with a wide range of managerial subjects. Together they provide a comprehensive explanation of the managerial process as it is viewed by practitioners and scholars in the field. The materials are organized into six sections: (1) Basic Elements in Management, (2) Planning, (3) Direction, (4) Control, (5) Organization, and (6) Staffing. Among the authors represented in the volume are Lawrence A. Appley, Peter F. Drucker, Frank E. Fisher, Schuyler Dean Hoslett, Keith Davis, F. J. Roethlisberger, Stephen B. Hodges, Ernest Dale, George Elbert Kimball, Lester R. Bettell, Charles S. Whit-

ing, Chris Argyris, John T. Diebald, Lyndall F. Urwick, and Louis A. Allen.

Max D. Richards is on the staff of Pennsylvania State University, and William A. Nielander is on the staff of Case Institute of Technology.

The Making of Higher Executives: The Modern Challenges, by Sir Noel Frederick Hall. New York: New York University School of Commerce, Accounts, and Finance, 1958, x plus 100 pages. $2.50.

The series of three public lectures on the subject, "The Making of Higher Executives: The Modern Challenges," that were delivered by Sir Noel Frederick Hall in February 1958 are reproduced in this volume. The lectures were made possible through a grant from the Ford Foundation establishing the Ford Distinguished Visiting Professorship, designed to bring outstanding educators from American and foreign universities to the New York University School of Commerce, Accounts, and Finance.

The lectures deal with the problem of adequate leadership for our business and economy. They stress that America's future in a free society will be determined not only in our scientific laboratories and by our military forces, but also by our ability to produce . . . that the efficiency of our processes of production will be determined by the vision and "know-how" of the leaders who manage them . . . that American educational institutions and businessmen recognize these facts and are striving to develop such leaders. The titles of the lectures are: (1) The Higher Executive: Developing the Whole Man; (2) The Henley Experiment, and (3) The Four Stages in Management Development.

Sir Noel Frederick Hall is Principal, the Administrative Staff College, Henley-on-Thames, England, and Ford Distinguished Visiting Professor, School of Commerce, Accounts, and Finance, New York University.

Accounting and Control

(*Continued from page 30*)

keeping—the constant perusal of records and the laborious job of taking stock counts on the floor—since proposed systems can provide up-to-date reports showing items requiring immediate attention, and in some instances the exceptions.

Other computer reports will help control markdowns; will help control stock levels; will help the over-all planning of purchases. The ultimate result will be that stores can maintain well-balanced stocks with minimum capital investments.

The era of electronics does not mean that electromechanical equipment will become obsolete. In fact, electromechanical equipment can be integrated with future electronic developments because of the compatibility principle. This means that retail managements today are in a position to review their systems problems with full confidence that partial steps made today are the only sure road to complete automation.

All professional systems men know that the coming of electronics has not had, and will not have, any effect on human nature. New ideas and new concepts can be conceived overnight; however, those responsible for administering and executing these new ideas as a system do not change as rapidly as new ideas are generated. Therefore, control and supervision will always be essential for expected results.

European Merchants Look at Automation

(*Continued from page 36*)

and perhaps less susceptible to the efforts of interested parties to "sell" him on a new idea largely because it is new; but even at this early stage in the new development he has given serious consideration to an evolution which may completely change his business and his role in the community.

Future of Automation

(*Continued from page 57*)

the opportunities for automation in display work will increase enormously.

The aspect of sales promotion which offers the most immediate possibility for introducing automation is the field of sales promotion management. Just as the merchandise managers have increased their use of machines in gathering and analyzing merchandising statistics, so also will the sales promotion managers increase the use of machines for recording statistical data concerning customers and the reactions of customers. It is unfortunate that most of the knowledge concerning customer reaction to sales promotion devices is almost wholly in the minds of sales promotion practitioners throughout the country. Only within recent years have scientific studies been started which will improve our body of knowledge of these important subjects. As these studies make sales promotion more scientific, there will be more opportunities for the use of automation.

For all of these reasons, it appears that we may expect to see increased automation activity in those aspects of retailing which work on customer demand. Just where and how automation will be used in this work is not clear from the present development. Nevertheless, the important point is that here is the greatest opportunity because this is where the least progress has been made.

Summary

A summary of the thoughts expressed here reveals that automation in retailing is further advanced on the supply side than it is on the side of demand stimulation. It also reveals that automation on either side becomes more difficult to achieve as we approach the intersection of the flow of merchandise and the flow of customers. In effect, this indicates that the really vital activities in retailing involve human relationships rather than mechanical relationships. A truly automatic retail establishment will not exist until somebody invents push-button customers. Meanwhile, our best opportunities for putting machines to work lie in the direction of achieving a greater understanding of our present beloved nonautomatic customers.

Machines Improve Merchandising

(*Continued from page 50*)

Summary

In summary, then, we see that automation promises to promote the effectiveness of the merchandising function in the retail store, enabling merchants to:

1. Reorder faster and therefore increase their sales and their share of the market.

2. Plan stocks in their individual stores to match customer demand.

3. Minimize markdowns by finding slow sellers more quickly.

4. Maintain balanced assortments and unbroken stocks as the selling season progresses.

5. Recognize trends earlier and therefore make successful selections in the market.

6. Obtain more effective support from the service and merchandise handling activities of the organization.

7. Cope more effectively with the complexities inherent in multiple unit operation.

8. Obtain detailed information to use in making decisions which now depend on rule of thumb.

Testing Textile Equipment

(*Continued from page 53*)

item in the laboratory. Many defects and flaws in textile products have been eliminated by predetermining the performance or serviceability through tests.

Machines have afforded greater accuracy in textile testing, created better correlation of results between laboratories, aided the laboratory in arriving at more conclusive results and recommendations, and removed much of the "guess work" in evaluating test results.

Future of Textile Testing

More and more testing can be expected in the future, as the retail buyer, the seller, and others connected with the merchandising of textiles are becoming increasingly aware of its value. Factual information is essential both to merchandising and to fostering consumer satisfaction.

More testing will be a necessity to keep pace with the advances that are being made, and will be made, in the field of textiles. Advances in the field of textiles mean parallel advances in textile testing with the aid of specially developed equipment.

Textile testing is not a "cure all" for the many problems that arise in the field of textiles, but can show, for the most part, whether a "red," "green," or "caution" light should be in operation.